

Supporting communities of practice

a survey of community-oriented technologies

How to make sense of this emerging market
understand the potential of technology
and set up a community platform



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Table of contents

Executive summary 1

I. Communities of practice 2

II. The market of community-oriented technologies 5

Communities of practice and technology: typical facilities 5

The broader market: a chart 8

Knowledge portals: the knowledge worker's desktop 11

Team work: online project spaces 15

Community management: website communities 18

On-line conversations: discussion groups 23

Synchronous interactions: on-line meeting spaces 28

On-line instruction: community-oriented e-learning spaces 32

Knowledge exchange: access to expertise 35

Knowledge repositories: documenting practice 39

Combining dimensions: convergence in the market 43

III. Understanding the role of technology 45

IV. Development and evaluation strategies 60

Additional resources 65

Executive summary

This report is intended as a guide for selecting and assembling a technological platform to support communities of practice across a large organization. To this end, the report addresses four questions:

1. *What makes communities of practice different from garden-variety online communities?*

Every group that shares interest on a website is called a community today, but communities of practice are a specific kind of community. They are focused on a domain of knowledge and over time accumulate expertise in this domain. They develop their shared practice by interacting around problems, solutions, and insights, and building a common store of knowledge.

2. *What categories of community-oriented products exist and what are they trying to accomplish?*

The ideal system at the right price does not exist yet, though a few come really close. But there are eight neighboring categories of products that have something to contribute and include good candidates to start with. Analyzing these categories of products yields not only a scan of products, but also a way of understanding the various aspects of a knowledge strategy based on communities of practice.

3. *What are the characteristics of communities of practice that lend themselves to support by technology?*

Technology platform are often described in terms of features, but in order to really evaluate candidates for a technology platform, it is useful to start with the success factors of communities of practice that can be affected by technology. The third section of this report provides a table of thirteen such factors with examples of how a technology platform can affect the success of a community in each area.

4. *How to use the answer to these questions to develop a strategy for building a platform for communities of practice?*

Most of the product categories can be a starting point for building a general platform. In fact, this analysis of the field suggests a strategy for approach the task. Decide what kinds of activities are most important for your communities. Select a product in that area, and expand it with elements from the other categories.

I. Communities of practice

The word community has become immensely popular. As a result, a large number of groups are called communities, even though they display very different characteristics. Among online designers and facilitators, just about every group that interacts around a topic is called a community. In particular, discussion groups are usually called communities.

Communities of practice can take very different shapes. They can vary along a number of dimensions. They can be tight-knit and small or loosely connected and large. But they all share a few characteristics. The term "community of practice" is of relatively recent coinage, but the phenomenon it refers to is age-old and social scientists have talked about it under various guises. In a nutshell, a community of practice is a group of people who share an interest in a domain of human endeavor and engage in a process of collective learning that creates bonds between them: a tribe, a garage band, a group of engineers working on similar problems.

Not everything called a community is a community of practice. A neighborhood for instance, is often called a community, but is usually not a community of practice. Three characteristics are crucial:

1. **The domain:** Since a community of practice is focused on a domain of shared interest, it is not merely a club of friends or a network of connections between people.

Membership therefore implies a minimum level of knowledge of that domain—a shared competence that distinguishes members from other people. (You could belong to the same network as someone and never know it.) The domain is not necessarily something recognized as “expertise” outside the community. A youth gang may have developed all sorts of ways of dealing with their domain: surviving on the street and maintaining some kind of identity they can live with.

2. **The community:** In pursuing their interest in their domain, members engage in joint activities and discussions, help each other, and share information. That is how they form a community around their domain and build relationships. Having the same job or the same title does not make for a community of practice unless members interact and learn together. The claims processors in a large insurance company or the students in American high schools may have much in common, but unless they interact, they do not form a community of practice. The Impressionists, for instance, used to meet in cafes and studios to discuss the style of painting they were inventing together. These interactions were essential to making them a community of practice even though they usually painted alone.
3. **The practice:** A community of practice is not merely a community of interest--people who like certain kinds

of movies, for instance. Members of a community of practice develop a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems—in short a shared practice. This takes time. A good conversation with a stranger on an airplane may give you all sorts of interesting insights, but it does not in itself make for a community of practice. The development of a shared practice may be more or less self-conscious. The “windshield wipers” community of practice at an auto manufacturer makes a concerted effort to collect and document the tricks and lessons they have learned into a knowledge base. By contrast, nurses who meet regularly for lunch in a hospital cafeteria may not realize that their lunch discussions are one of their main sources of knowledge about how to care for patients, even though in the course of all these conversations, they have developed a set of stories and cases that become a shared repertoire for them to think about and discuss new cases.

We all belong to communities of practice. They have been around for as long as human beings have learned together. At home, at work, at school, in our hobbies, we belong to several communities of practice at any given time. And the communities of practice to which we belong change over the course of our lives. In fact, communities of practice are everywhere.

The concept of community of practice has found a number of practical applications in business, organizational design, education, and civic life.

Business organizations. The concept has been adopted most readily by people in business because of the increasing need to focus explicitly on knowledge (Wenger, McDermott, and Snyder, 2001). Initial efforts had focused on information systems with disappointing results. Communities of practice provided a new approach, focused on the social structures that could best assume ownership for complex and dynamic knowledge with substantial tacit components. A number of characteristics make communities of practice a natural fit.

- Unlike training or research departments, they are not separate units. Rather they pervade the organization, since people belong to communities of practice at the same time as they belong to their business units or teams.
- Communities of practice address the informal and tacit aspects of knowledge creation and sharing, as well as the more explicit aspects.
- They allow a much closer connection between learning and doing, while still providing structures where learning can accumulate.
- In a time of globalization and disaggregation, they create connections among people across institutional boundaries and potentially across the globe.

From this perspective, the knowledge of an organization lives in a constellation of communities of practice each taking care of a specific aspect of the competence that the organization needs. However, the very characteristics that make communities of practice a good fit for stewarding knowledge—autonomy, practitioner-orientation, informality, crossing boundaries—are also characteristics

that make them a challenge for traditional hierarchical organizations. How this challenge is going to affect these organizations remains to be seen.

Education. In business, focusing on communities of practice adds a layer of complexity to the organization—a kind of orthogonal structure focused on knowledge, while the core structure of the organization still focuses on business processes and results. But they do not imply a restructuring the whole system. Schools have been a bit slower at adopting the concept of communities of practice because sharing knowledge is already their main activity, and adopting communities of practice as a basic organizing principle implies a deeper rethinking of their structure. In educational circles, the hope is that communities of practice could bring the experience of schooling closer to everyday life along three dimensions.

- *Internally:* How to ground school learning experiences in practice through participation in communities around subject matters?
- *Externally:* How to connect the experience of students to actual practice through peripheral forms of participation in broader communities beyond the walls of the school?
- *Over the lifetime of students:* How to serve the lifelong learning needs of students by organizing communities

of practice focused on topics of continuing interest to students beyond the schooling period?

From this perspective, the school is not the privileged locus of learning. It is not a self-contained, closed world in which students acquire knowledge to be applied outside, but a part of a broader learning system. The class is not the primary learning event. It is life itself that is the main learning event. Schools, classrooms, and training sessions still have a role to play in this vision, but they have to be in the service of the learning that happens in the world.

More generally, the concept of community of practice has promise in suggesting ways to organize societies around issues and functions. The US government and the World Bank are experimenting with these approaches by connecting people across cities and countries with practice-based communities that complement place-based communities. New technologies such as the Internet have extended the reach of our interactions beyond the geographical limitations of traditional communities, but the increasing flow of information does not obviate the need for community. In fact, it expands the possibilities for community and calls for new kinds of communities based on shared practice.

II. The market of community-oriented technologies

There are not many systems explicitly oriented to communities of practice. In fact, I will assume right now that the space is empty and that the perfect product for a general community-of-practice platform does not exist. This is somewhat unfair because a number of products have enough relevant features to be useful. A number of companies are moving toward the community of practice area by expanding on their basic facilities. Some may even claim they have all it takes. Still, the market is in an early phase, with many products focusing on one or more aspects of the whole picture. At this point, it is more productive to assume that no one is really there and that ideal systems will arise from combinations and convergence in the market as it matures.

Typical facilities useful to a community of practice

The most common on-line facilities that communities of practice can use include:

- a home page to assert their existence and describe their domain and activities
 - a conversation space for on-line discussions of a variety of topics
 - a facility for floating questions to the community or a subset of the community
 - a directory of membership with some information about their areas of expertise in the domain
- in some cases, a shared workspace for synchronous electronic collaboration, discussion, or meeting
 - a document repository for their knowledge base
 - a search engine good enough for them to retrieve things they need from their knowledge base
 - community management tools, mostly for the coordinator but sometimes also for the community at large, including the ability to know who is participating actively, which documents are downloaded, how much traffic there is, which documents need updating, etc.
 - the ability to spawn subcommunities, subgroups, and project teams

Furthermore, a technological platform for communities of practice should ideally be

- Easy to learn and use because communities of practice are usually not people's main job
- Easily integrated with the other software that members of the community are using for their regular work so that participation in the community requires as few extra steps as possible
- Not too expensive. If it requires a lot of investment up front, potentially useful communities will not be able to take advantage of the platform. Indeed, many communities start with only a partial understanding of the value they will provide eventually.

A sample product

Even though I have assumed that the ideal system for a general platform for communities of practice does not really exist yet, a few systems were designed from the start with the goal of addressing the needs of communities of practice. They are not fully there yet, but Communispace will serve as a good illustration for this introduction because of the attention paid to community activities and social dynamics.

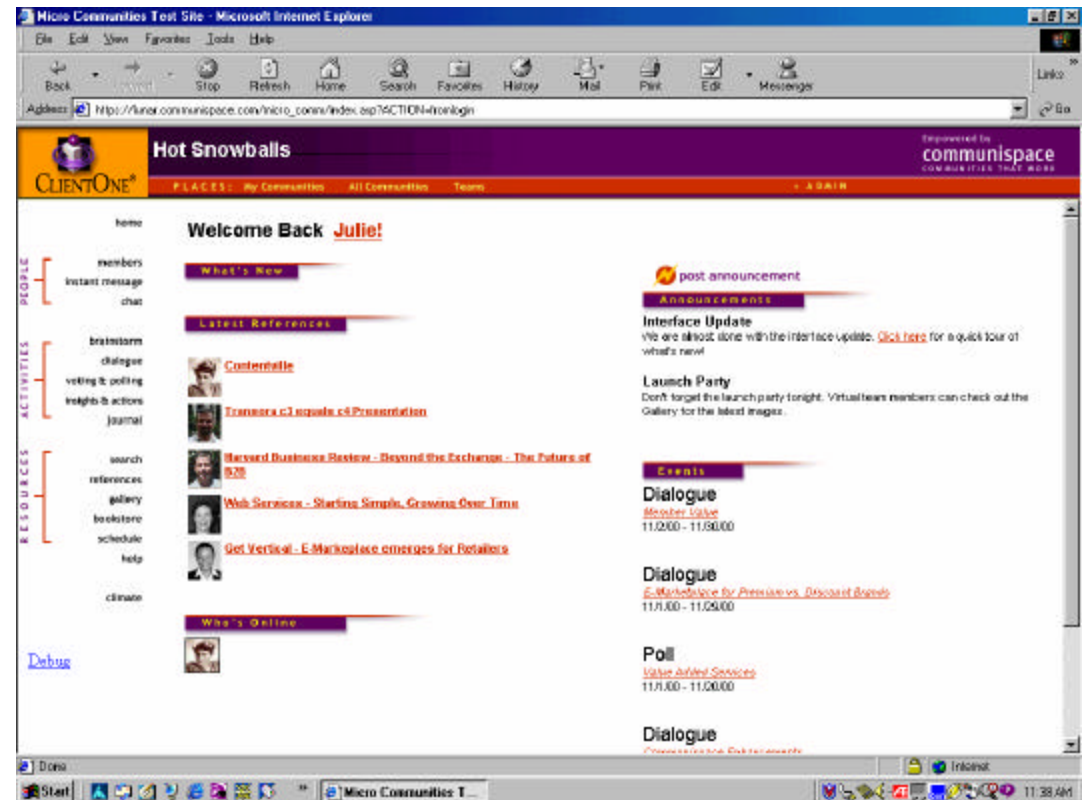
Communispace

Communispace Corporation

www.communispace.com

General description

Like many systems designed to support online communities, Communispace is a browser-based system that provides a virtual space for participation. What distinguishes Communispace is the company's effort to provide explicit support for typical activities that focused communities engage in, during their formation and their ongoing work. As a result, Communispace provides facilities for activities such as framing issues, brainstorming, making decisions, or analyzing the "community climate," in addition to more traditional facilities such as asynchronous discussions, chat, calendar, organizing documents, and creating profiles of users. This support is based on a model of these activities and provides direction for the process. For instance, the



brainstorming facility will take the group through the various phases of brainstorming: generating ideas, discussing them, ranking them, and selecting.

By focusing on activity structure and social dimensions in combination, Communispace uses technology to encourage participants to engage in community-oriented activities. This includes reflection on the quality of the

community in terms of relationships, level of trust and participation, nature of conversations, etc.

Even for the more traditional offerings, Communispace has a few original touches that reflect attention to the nature of activities. For instance, its asynchronous discussion facility requests contributors to categorize their contribution according to a taxonomy of ten different “speech acts” including question, answer, request, offer, assent, dissent, etc.

Because Communispace places the emphasis on enforcing or fostering community-oriented behavior through the technology, it expects members to use the community space as their primary interaction locus, rather than, say, e-mail. In this sense it may require difficult behavioral changes. For use in a broader work context, the system may not always provide enough ways to integrate with others systems people use.

The ability to handle documents in a knowledge base is still underdeveloped for a full community. The search facility only works on keywords. Communispace is developing links to some of the major search engines and knowledge-base systems. In addition, it is working with a partner to develop some native full-text search capability for customers who do not have access to these other systems.

Pricing structure

Contract: Only available on an ASP basis, with SSL secure socket, and one machine per client.

Prices: Communispace just changed its pricing structure. These prices include the technology as well as a good amount of community administration support.

a) Per community pricing (up to 150 members):

- Initial launch: \$30,000
- Monthly ASP fee: \$5,000-6,000
- Additional members \$40 per month
- Per-community price decreases 10% each time the number of communities doubles

b) Enterprise pricing per seat:

- Initial setup: \$125,000
- Monthly ASP fee: \$48-\$16 per person, depending on volume

Advantages

- Very community-oriented design, based on a sophisticated model of community activities.
- Actively encourages community-building behavior.
- A number of subtly clever features.
- Based on a method to build communities, which is part of the service.

Disadvantages

- Relatively expensive for informal communities, in part because of the bundled administrative services.
- Not really a self-service system.
- The system is designed for close-knit communities that need to do a lot of activities together.
- Lacks document sharing infrastructure
- The behavioral directiveness may require excessive commitment for looser communities.

- Not clear how to handle “peripheral participants” because of price and lack of sophisticated membership management.
- Mostly stand-alone at this point; not easy to integrate with existing enterprise systems

Comments

Communispace is a good candidate for a system for communities of practice though it lacks some crucial features, which will be described later in this section. The pricing strategy, however, is not appropriate for a general platform. The relatively high price per community might discourage some communities from coming into existence if their initial sense of value is tentative. Moreover, Communispace pricing does not encourage open boundaries since a lurker takes the place of a potential active member.

With its pricing strategy, Communispace works best for specific communities whose business promise justifies the expense. In fact, it has largely been used as an online workspace by large, distributed business teams with a clear task whose immediate return could be easily described on the outset.

It is not clear what kinds of markets the company is going to focus on in the future and whether its business plan will push it toward supporting teams. As with many young companies, however, nothing is written in stone. For instance, Communispace says that they might offer licensing as well as ASP when the features of their software have stabilized, some time in 2001.

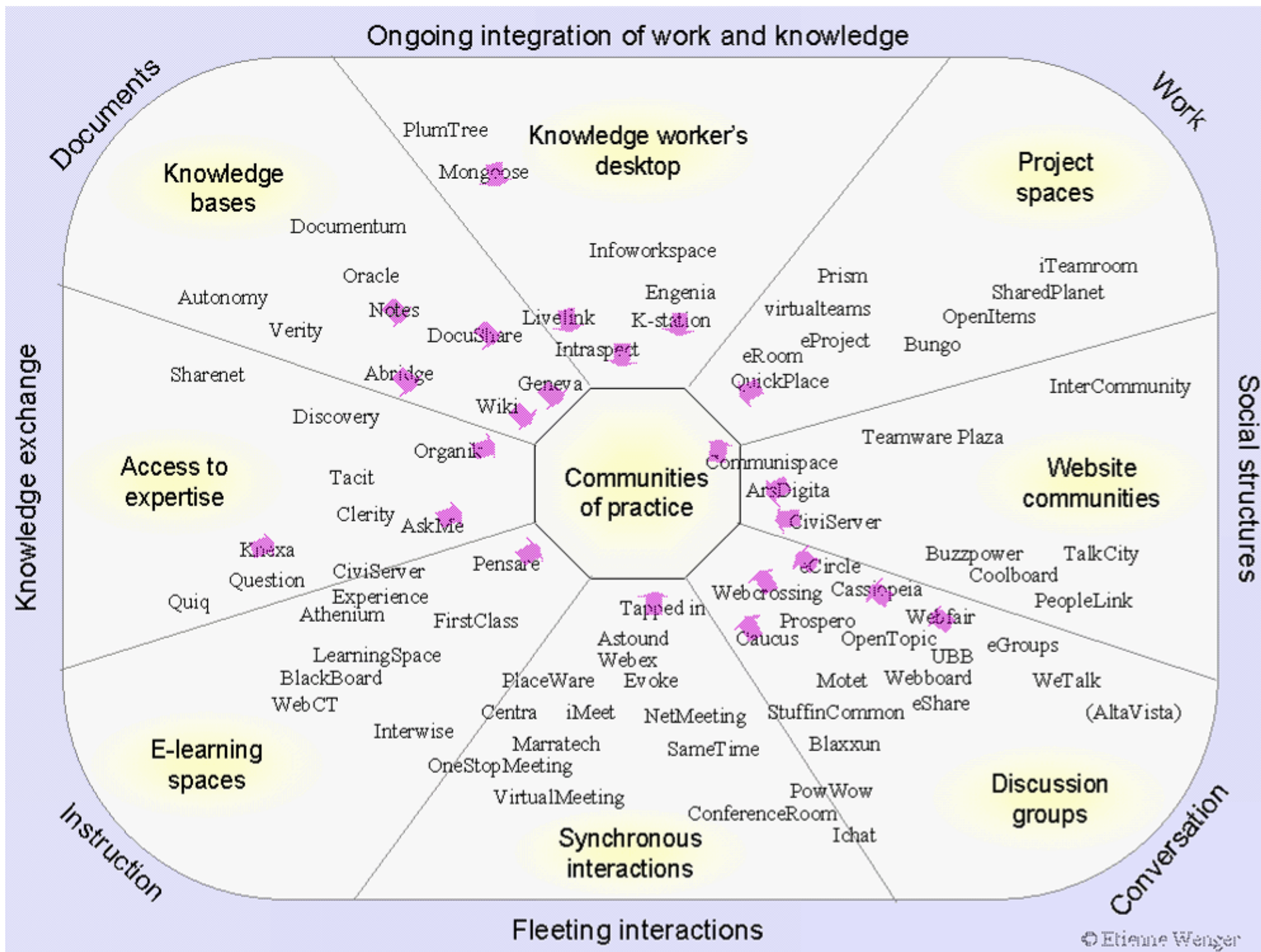
The broader market: a chart

While no one has everything for communities of practice, many products have something. In order to understand the market and its future, it is useful to cast a wide net and consider the potential of a variety of community- and knowledge-oriented technologies.

Figure 1 below is a graphic representation of the current market of community-oriented technologies in relation to the needs of communities of practice. The chart shows eight categories of related products that have relevance in considering technologies for communities of practice.

- Desktop of the knowledge worker: complete portal-like applications for managing participation in multiple groups
- Online project spaces for team work
- Website communities, such as customer communities, where the management of membership is important
- Discussion groups typically targeted at communities of interest with little commitment to a shared practice
- Synchronous meeting facilities, online auditoriums, conference rooms, and chat
- Community-oriented e-learning systems
- Access to expertise, through questions or expert profiles
- Knowledge repositories

In fact, all of these product categories represent activities that are important dimensions of a community-based knowledge strategy.



Placing products on the chart

The placement of each system on the chart is a subjective attempt to represent approximately:

- In which category it falls: the main strategic intent behind the product
- How it clusters with other products it competes with
- How close it is to the boundaries of the category: is it a typical example or more of a hybrid
- How close to the center: how close it is to supporting communities of practice compared with other products in this category

An arrow means that the system is moving toward supporting communities of practice. The placement of a system is NOT a statement that:

- a system is better than others in an absolute sense (being close to the center is only a matter of potential support for communities of practice specifically)
- a system only provides facilities associated with its main category (for instance, many asynchronous discussion systems also have chat facilities)

Analyzing the market

The rest of this section describes the broader community technology market in its relation to communities of practice.

In the first eight subsections, I will describe each category of systems in detail, starting with the knowledge worker's desktop and going through the figure in clockwise fashion. For each category, I will provide:

- A general description of the category
- The various perspectives and approaches as represented by groups of products in this category
- A list of common features
- An in-depth description of one or two paradigmatic products (chosen because they represent the category well rather because of their intrinsic quality).
- A list of other products, with URL for more information and sometimes with a brief comment

In the description of sample systems below, I try to give a sense of the cost. All pricing structures are provided as a general indication of the cost of the product. They are not meant to be exact and are not necessarily the price you would pay under a specific contract. They are subject to change. I only discuss pricing because pricing structures can influence the usability of a platform, especially for tentative communities and participants.

At the end of this section, I will come back to the overall shape of the chart and describe how to interpret its axes:

- Knowledge exchange versus social structure
- Conversation versus repositories
- Instruction versus work
- Ongoing integration of work and knowledge versus fleeting interactions

This closer interpretation of the figure will show how the market's search for the ideal system depends on the convergence of these categories. At the same time, this evolution reveals something interesting about the deep structure of the problem of community-based approaches to knowledge.

Knowledge portals: the knowledge worker's desktop

These systems aim at providing a full “portal” into the extended enterprise for the knowledge worker. They are intended to be these workers’ point of entry into their work, their projects, their teams, as well as their communities of practice and other sources of information, and thus to merge work and knowledge management. They are very comprehensive and incorporate many of the features of the other types of systems.

These systems are based on the assumption that knowledge workers participate in multiple groups, projects, and communities, and have to manage this multimembership. Attention management is a central theme of their design. The second theme is group memory management, making a complex store of information and knowledge accessible through sophisticated search engines.

In summary, serving the needs of the knowledge worker requires attention to the following set of issues:

- Merging knowledge management and work by offering a single point of entry
- Serving the multimembership of the knowledge worker in multiple project teams and communities
- Attention management: coordinating a central focus on one’s work with peripheral attention to other parts of the organization

These systems are meant to be mission-critical for the organization. Use is expected to be pervasive across the organization. Participation on the part of those who use the system is expected to be very intensive, usually their primary “desktop.” As a result organizations will be ready to pay a high price.

Perspectives

- *Group memory with information buckets among which to manage attention:* Intraspect
- *Social group as the basic unit for organizing document and work:* LiveLink
- *Portal for managing the desktop according to an ontology for representing the organizations:* Engenia (objects and relations), k-station (people, places, and things)
- *Physical metaphor of virtual buildings:* Infoworkspace

Typical features

- Customizable desktop
- Management of multiple views onto relevant sources of information
- Full-text, full-index search engines
- Subscription and notification
- Conversation spaces
- Project management capabilities
- Underlying ontology

While these systems will usually turn out to be too expensive for many communities of practice, they have (at least potentially) most of the facilities necessary to support the development and work of communities of practice, and they can fully integrate these communities into the working of the organization.

Products

Intraspect

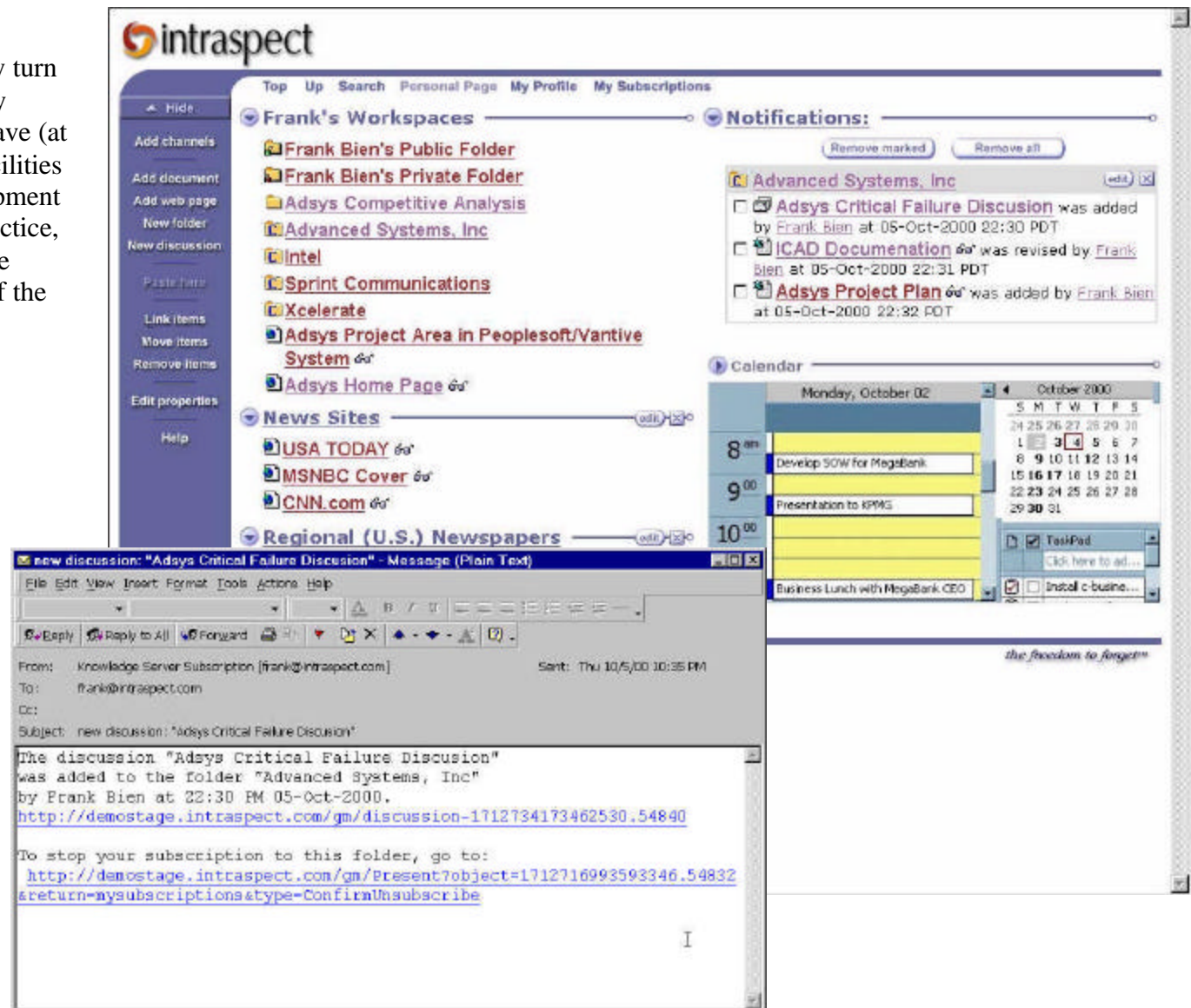
Intraspect Software, Inc.

www.intraspect.com

Overall description

Intraspect Knowledge Server's underlying metaphor is "group memory" whose basic elements are information buckets, such as cabinets, files and information objects. The focus is on how individuals can most efficiently participate in such group memory.

Intraspect does not attempt to enforce any model of community behavior or structure. Rather it is a general "collaborative business" utility, which is meant to expand



the existing ways an organization works with group memory facilities. For instance, given that many knowledge workers live in e-mail, Intraspect does not fight that but on the contrary makes it easy to participate in group memory via e-mail. All objects and containers have an e-mail address, so that if you want to contribute something to your project folder or comment on a document, you can just e-mail to it. Or you can elect to receive all your notification via e-mail.

The underlying “plumbing” for group memory management addresses four basic aspects: memory organization, access structure, interaction around memory objects, and personal attention management.

Every object has a unique identifier but can be accessed and viewed from multiple contexts. Intraspect uses metadata to capture the context of use of information: who contributed it, when it was used in what circumstances, and what comments others made about it. This memory can be accessed through full-text and metadata search.

Intraspect has very detailed access rights control, made transparent with explicit access policies associated with every object. To support multiple contexts, Intraspect offers the possibility of specifying multiple access policies with every object. In this context, information is published, not by broadcasting (which creates duplication), but by changing access rights.

With every object, one can also associate interaction streams. This includes commenting streams (collaborative

annotation) and threaded discussion. Multiple streams of comments and discussion can be associated with the same object.

From a personal standpoint, Intraspect offers an interactive portal onto the group memory. It is basically an “attention management” portal for participating in complex information system. Its main feature in this regard is a system of universal subscription that allows a person to be notified on the desktop or by e-mail, of any activity associated with any object. Because searches themselves can be made into objects, you can subscribe to a search, which means that you will be notified every time a new object is collected that fits the criteria of the search.

Pricing structure

Contract: Outright license on a per-seat basis, with annual maintenance contract of about 20% of purchase price.

Prices: About \$700 per seat, with discounts for large numbers of licenses.

Advantages

- Sophisticated, clean, elegant infrastructure, built entirely on open web standards.
- Easy to contribute to the group memory
- Sophisticated search and access facilities (Autonomy)
- Merges working and knowledge management into one system
- Sophisticated attention management for participating in complex organizational systems.

Disadvantages

- Expensive, and therefore would only work for communities of practice when an organization has made a commitment to the system as a general working environment.
- Not too great for defining “places” for communities because the ontology is based on information objects and containers rather than social structures. A social structure from this perspective is just another “information container.”
- No explicit community management tools.

Comments

Assuming that everyone has a paid seat, Intraspect could be a very good tool for supporting communities of practice, especially in an environment where every person belongs to a large number of communities and where therefore attention management becomes a crucial issue. Given the sophisticated infrastructure and the fact that the system already has a notion of “distinct space,” features to add community of practice to the basic ontology would probably be easy to program.

Engenia Unity

Engenia

www.engenia.com

The underpinning architecture of objects and relations is an elegant, very general way to represent an organization. Engenia then associates a view (i.e., a window) with any object and relationship relevant to the user. The desktop is then configured by manipulating these views to provide a personalized portal onto the work of the organization,

including applications, projects, discussion threads, journal threads, etc. Engenia is building a collection of typical object types that form the growing library from which it can customize portals for its clients. The system is expensive because its very high level of customization at this stage still requires a lot of programming (each window is programmed). Over time, as more business objects become standardized, one can hope that the price will come down.

K-station

Lotus Development Corporation

www.lotus.com/kstation

Lotus’ knowledge worker’s portal is based on a metaphor of people, places, and things to give context to information. “Portlets” open windows onto any place. Allows both group and individual views and view management. Includes Discovery relationship builder and Quickplace.

LiveLink

Open Text

www.opentext.com

A well-established knowledge-management system that has turned into an enterprise collaboration system. It is largely oriented toward teamwork, has good team space facilities, and sophisticated knowledge-base capabilities with detailed control of access levels.

Infoworkspace

General Dynamics

www.infoworkspace.com

Team work: online project spaces

These systems provide an online space for a project team to conduct its work. They focus on project management, task scheduling, and managing collections of project-related documents.

While these systems are usually not designed with communities of practice in mind, they contain many of the features necessary for a community of practice to come together. As a result, some of these products could be used for communities of practice. But there is a danger: because the technology is oriented toward tasks, task assignment, and task scheduling, it could create more of a team relationship among participants.

Perspectives

- *A general shared workspace for projects:* eRoom, QuickPlace, eProject
- *Embodying a specific team process:* virtualteams.com, The Prism Project
- *Public hosted project spaces:* iTeamroom, Bungo, OpenItems, SharedPlanet

Typical features

- Workspace management: membership, access rights, customization
- Team calendar
- Team management facilities: adding members, access control

- Project management facilities: status, milestones
- Task management facilities: assignment, scheduling, monitoring
- Folder structure for sharing project-related documents
- Search mechanism
- Check-out and version control for working on common documents
- Notification of events, deadlines, changes
- News board
- Discussion board
- Instant messaging
- Presence awareness
- Polling and voting

Sample products

QuickPlace

Lotus Development Corporation

www.lotus.com/products/qplace.nsf

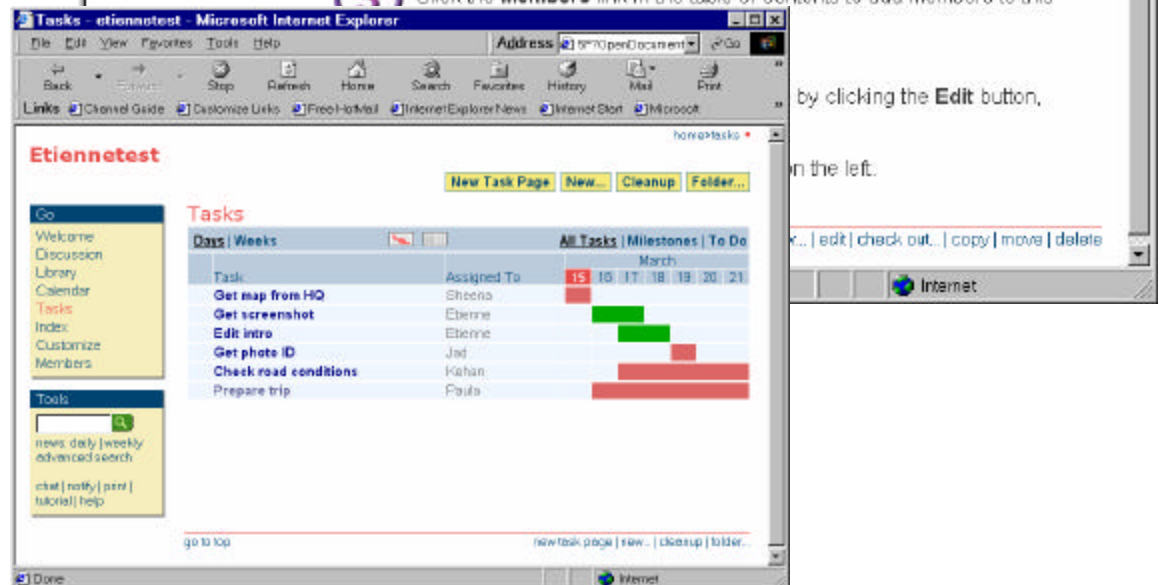
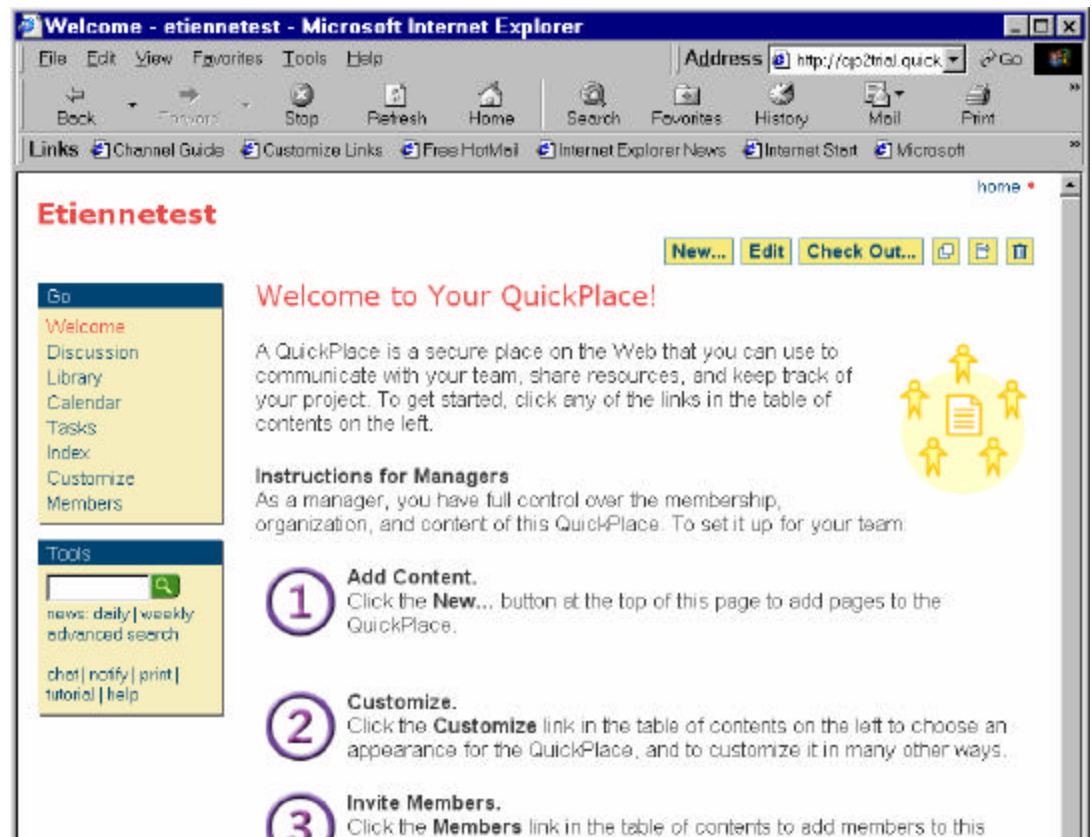
QuickPlace is a browser-based application, which has all the features listed above. As its name indicates, the purpose of QuickPlace (and of many competing products) is to allow a team to set up a virtual, secure workspace very quickly and be up and running in no time. Using their browsers, team managers can quickly open and furnish a space, and invite members by using existing directories as well as adding external names. Subgroups of members can also create their own private rooms.

The space is primarily designed for asynchronous access by members, but presence awareness, instant messaging, and chat facilities allow them to do some synchronous work as well.

The document storage has all the basic features: folders (of multiple types), elementary document management and version control, and full-text indexed search. To facilitate sharing and integration with other application, a sophisticated publishing facility allows documents authored outside of QuickPlace to be viewed by team members through their browser (whether or not they have the native application), yet still continue to be edited in their native format.

For project management, tasks can be defined, assigned to members, and displayed in the calendar or on a Gantt-chart timeline. Reminders can be sent when deadlines approach. Customized forms and workflow processes can also be created using the browser.

At the end of the project, the space can be stripped of project-specific information and saved as a template for other projects of the same type.



Pricing structure

Contract: QuickPlace can be licensed either as part of a broader Lotus Notes contract or as a stand-alone server. A number of independent ASP also lease QuickPlace.

Prices: Prices vary with contracts. Typical volume licensing from Lotus: \$39.00 per seat.

Advantages

- Well-established platform. Can work in stand-alone mode or in conjunction with Lotus Domino.
- Easy to start a project: quick self-service setup of the space by the team manager.
- Well integrated with common business applications such as Windows Office.
- Multiple levels of customization to accommodate both team managers and software developers

Disadvantages

- Relatively costly (some products are available for free).

Comments

QuickPlace can be integrated into K-station so that members can manage their participation in multiple teams and communities at once.

eRoom

eRoom Technology Inc. (formerly Instinctive Technology)
www.eroom.com

eRoom was one of the first stand-alone project space on the market. It is very comparable to QuickPlace (Will I get into trouble for saying this?) and also includes a portal for managing multimembership. It is used by many companies that are not committed to Lotus.

eProject

eProject.com

www.eproject.com/newsite/enterprise.htm

Project Prism

ZXVC/Prism

http://12.19.136.102/asp/demo_doc

Virtualteams

Virtualteams.com

www.virtualteams.com

Integrated with LiveLink to include a built-in team launch process.

Teamroom

Lotus Development Corporation

www.lotus.com/products

BungoPro

Bungo.com

www.bungo.com

OpenItems

Openitems.com

www.openitemscom

SharedPlanet

Skydesk Inc.

www.sharedplanet.com

Community management: website communities

These systems stand halfway between the interest groups and more sophisticated knowledge worker desktop systems. They support more or less tightly connected communities across organizations and their boundaries, including customers, suppliers, partners, and employees.

These systems usually have somewhat more complete community capabilities than the discussion group systems, but like them, they focus on communities such as customer or supplier groups, which can remain rather loose. They place the emphasis on interactional capabilities and often lack sophisticated repositories for documents. They do not necessarily attempt to create a sense of closeness. They often handle very large groups.

A number of systems in this group present a good potential for supporting the online component of a community of practice. Most of them were originally designed for managing websites with customer communities. (Many have e-commerce capabilities, for instance). But the more sophisticated ones have many of the features that would make them adaptable to a range of types of communities of practice. In fact, some of these companies aim to become the standard infrastructure for online community development.

Perspectives

- *Providing a general toolkit for building and managing websites with online communities:* ArsDigita
- *Creating an “operating system” for online communities that integrates facilities into the basic building blocks of successful communities:* RealCommunities
- *Managing community-oriented websites:* Teamware Plaza
- *Customer relationship management through online communities:* Buzzpower, CoolBoard, eShare, PeopleLink, TalkCity

Typical features

- Member identification, directories, and profiles
- Asynchronous discussion boards
- Chat
- Presence awareness
- Instant messages
- Document folders
- Feedback and rating mechanisms
- Customization of community space
- Subcommunities
- E-commerce facilities
- Calendar of events
- Administration console
- Activity analysis and management tools

Sample products

ArsDigita Community Systems

ArsDigita Corporation

www.arsdigita.com

ACS is not typical of this group because it is an open source system. It is a set of modules that form a sophisticated toolkit for general website management with a community orientation. The main market seems to be customer communities, but the toolkit is sophisticated and extendable enough that it could be used to build web support for communities of practice.

Overall description

The toolkit includes five sets of site-building tools, which represent the company's model of an online community. Each set contains a series of modules for accomplish various tasks.

- **Publishing:** authoring, editing, and approving content, banners, and design templates, as well as filtering content, FAQ's, polling, surveying, etc.
- **Personalization:** registering members, tracking their activities, helping them find relevant content and navigate, building user profiles, personal portals, subgroups, access control, etc.
- **Collaboration:** sharing and accessing information from any web browser, bulletin boards, discussion groups, chat rooms, web-based email, calendar, bookmarks, address books, file storage, presentations.
- **Transaction:** E-commerce capabilities, including collaborative filtering, recommendation tracking,

classifieds, auctions, security, auditing and online reporting.

- **Site Management:** auditing, directory, statistics, search, and logging and responding to user inquiries and requests.

Pricing structure

Contract: This is an open source community. ArsDigita offers consulting and education services.

Prices: The software itself is free (open source), though the complexity of the toolkit will probably require many customers to take advantage of the company's consulting and educational offerings.

Advantages

- Open source implies a whole community of developers who are constantly extending and improving the software.
- New releases come out every eight weeks. The system is constantly evolving.
- Because of the open source approach, you are less dependent on ArsDigita itself as you have a whole community of independent entities developing the platform.

Disadvantages

- This complex toolkit will require sophisticated expertise on the part of system administrators, who need to become members of the developers community.

Comments

This is a complex set of offerings with good potential to evolve and grow. The software is free and the toolkit is evolving dynamically, but one needs to make sure the technical infrastructure and expertise exist to make it work. If you have a few sophisticated programmers who are interested in joining the ArsDigita community, the offer is attractive. While such an approach may seem risky, reputable organizations like Siemens and the World Bank have found the offering reliable.

CiviServer

RealCommunities, Inc.

(Now merged with the enterprise-portal company Mongoose Technology)

www.realcommunities.com

Overall description

The purpose of the company is to build the “operating system” of community support with an emphasis on membership management. Like Communispace, this system is designed according to a model of communities. But while Communispace focuses primarily on typical community activities, CiviServer focuses on what defines membership and motivates people to participate. It is based on a series of 12 principles of community building, such as the centrality of common purpose, the need for identity, the importance of reputation, the issue of governance, or the value of boundaries.



For each of these principles, the company intends to produce a parameterized module that manages that aspect

of community: an “identity manager” a “reputation manager” or a “communication manager.” To manage all these managers, RealCommunities has designed a “workbench,” a general administration “console” that allows system administrators to customize the site, manipulate the variables of the various manager programs (e.g., set the rules of what behaviors give people points on their reputation scale), and monitor the community in general and the behavior of individual members.

This “operating system” level is a kind of mid-level design, below specific applications, but above raw utilities. Below, CiviServer incorporates utilities as “peripheral” such as discussion boards or file management systems. Above, the company (and presumably others eventually) design specific applications, like the mentoring facility CiviServer Experience (see section on “Access to expertise”).

Pricing structure

Contract: Available both in ASP and license modes.

Prices: CiviServer is fairly expensive. The price depends on the number of channels (or topic-oriented subcommunities):

- ASP contracts run between 2,500 and 6,500, plus a fee of 15,000 of integrating CiviServer with another registration system.
- Annual licenses start at 25,000, plus 25,000 integration fee.
- Permanent licenses run between 75,000 and 175,000, plus 25,000 integration fee and 20% maintenance.

Advantages

- Built explicitly on a theory of how communities function and what leads people to participate in them.
- Provides an integrating infrastructure for “plugging in” a variety of modules.
- Console makes community management easy for people with very different levels of programming ability, from system designers to non-programmer community facilitator.

Disadvantages

- Fairly costly.
- Focused almost exclusively on membership management (but could be an advantage from an integration standpoint).
- Not yet fully functional. While the company’s overall vision holds a lot of potential, the current system is only a very partial realization of that vision.

Comments

By focusing on a “mid-level” design between utilities and applications, RealCommunities aims to provide an integrating system, which is missing today in the disparate website community market.

Other products

Buzzpower

Multex.com

www.multex.com

CoolBoard

CoolBoard.com

www.coolboard.com

eShare Expressions

eShare Communications

www.eshare.com

InterCommunity

Lotus Development Corporation

www.lotus.com/home.nsf/welcome/products

PeopleLink

PeopleLink, Inc.

www.peoplelink.com

TalkCity

TalkCity

www.talkcity.com

Teamware Plaza

Teamware/Fujitsu

www.teamware.com

On-line conversations: discussion groups

Products in this category aim to support conversations among loose communities—communities of interest, or often just discussion groups. These groups are sometimes very large, with multiple topics. The focus of these systems is almost exclusively on conversational interactions, usually through asynchronous discussion boards, though in most cases this is augmented with chat capabilities, presence awareness, and instant messaging.

Most of these products lack good document storage and search facilities for uploaded files, but they are usually relatively inexpensive. Some of these systems have been in use for many years, with large industrial sites and have reached industrial strength even though the companies are still young and small.

Some of these companies are starting to add features to their system in order to address a broader spectrum of community needs, including reputation of members and connections to knowledge bases. When the company's business strategy moves in such a direction, the system is increasingly able to serve communities like communities of practice.

Perspectives

- *The plumbing for large interest-group discussions:* Webcrossing, Prospero, OpenTopic, Caucus
- *“Shrink-wrap” versions of same:* Motet, Webboard, UBB, eShare
- *Public discussion groups where people can discuss topics of interest to them:* eGroups, eCircle, Cassiopeia, Webfair, WeTalk. (Many of these companies offer their software for others to use as well.)
- *A space of rooms and whiteboards for posting material:* StuffinCommon
- *Graphically complex simulated worlds:* Blaxxun

Typical features

User-oriented features

- Asynchronous conversation spaces
- Threaded and/or streaming discussion
- Indication of “new” entries
- Bookmark for messages
- Subcommunities for subtopics
- Public user profiles
- User preferences for viewing and selecting postings
- Navigation facilities among topics
- File upload with postings

- Search mechanisms for discussion postings, but not for uploaded files
- Some e-mail support

Administrator-oriented features

- Simple authentication capabilities
- Posting management facilities: editing, clean-up, archive
- Profanity filters
- Monitoring and administration facilities, such as traffic analysis, setting privileges
- Customizable user privileges such as opening new topics
- Customizable look and feel

Products

Webcrossing/Sitecrossing

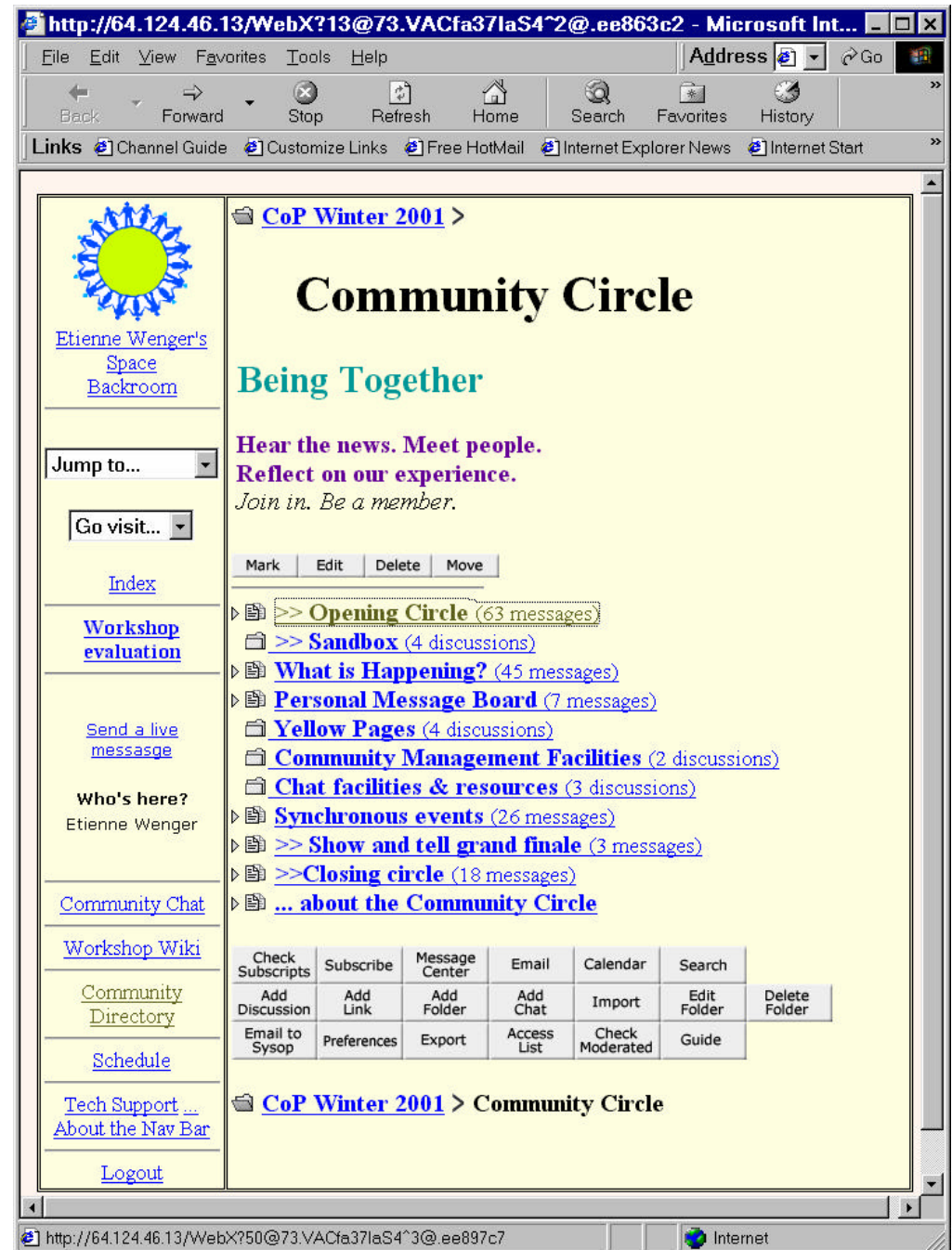
Web Crossing, Inc.

www.webcrossing.com

There is also a website management and intranet-oriented version at www.sitecrossing.com (The websites contain very detailed and useful comparison tables with competitor products)

Overall description

Webcrossing offers a series of “discussions” in which participants post their entries on various topics. The discussions are organized in a hierarchy of folders. Each folder can contain any number of discussions, web objects, as well as other folders. This provides for unlimited levels of topics and embedded subtopics. The



system comes with a built-in chat facility, the ability to see who else is on, and instant messaging.

Participants can view the outline of a discussion before looking up specific messages. They can also ask the system to take them wherever there are new postings since their last visit. They can subscribe to a discussion and receive entries by e-mail.

Each discussion can be customized by the host. It can be set to be “streaming” (entries in chronological order) or “threaded” (an entry and responses to it are kept together). The header of entries can be made to show a small picture of the author. The system is fully web-enabled: each message has its own URL, which makes it easy to link to any message.

Unlike many systems that rely on an external database, Webcrossing includes its own object-oriented, searchable database, where it keeps information about messages and users. Because Webcrossing has its own database, it fully self-contained. It can run as a stand-alone product. Having its own non-standard database, however, makes it more difficult to share data such as user profiles with other applications. Integration with other databases requires scripting.

Webcrossing comes with its own macro language for customizing and adding functionality. There is a significant community of people contributing their macros to a common knowledge base and discussing their problems on their site www.webxharbor.com.

Pricing structure

- **Contract:** Webcrossing is available under both a licensing or an ASP agreement. In both cases, the price is determined by the volume of use calculated in terms of pageviews.
- **Prices:** The ASP price is 1.50 per 1000 pageviews, with a minimum of 50/month. For licensing, the system is free under 1k page views a day. Then the price increases in steps, up to a maximum of 35,000 for unlimited page views per day.

Advantages

- Very customizable and scalable. Easy to add functionality.
- Stand-alone.
- With the cost starting at zero and then proportional to actual usage, it is easy to test the water first.
- WAP compatible.
- Progressive pricing structure.

Disadvantages

- The macro language offers a lot of flexibility, but requires some programming expertise.
- Non-standard database.

Comments

Webcrossing “powers” many large public sites, including CNN, Lycos, and the New York Times. The company is developing new facilities to offer a more complete community infrastructure, including file sharing.

Prospero

Prospero Technologies

www.prospero.com

Derived the merger of Well and Delphi. Only under ASP contract. Powers many large public sites, including CBS, AARP, Washington Post.

UBB (Ultimate Bulletin Board)

InfoPop

<http://infopop.com>

Another derivative from the Well. For smaller sites. Very inexpensive at \$199.

OpenTopic

InfoPop

<http://infopop.com>

Larger-scale, ASP version of UBB, with beefed-up community management facilities.

Caucus

Caucus Systems

www.caucus.com

A classic among discussion systems. Good for conversation streams. Only three levels of folder hierarchy. Rather pricey.

Forums

Formerly Allaire, now Halleluia Networks

www.forumspot.org

Allaire Forums for Cold Fusion have now been release in open source.

Webboard

O'Reilly & Associates

www.webboard.oreilly.com

A well-designed discussion board system for under \$2,000. Being acquired by www.chatspace.com.

Motet

Motet

www.motet.com

Ichat Internet Community Suite

Ichat

www.ichat.com

PowWow

Tribal Voices

www.tribal.com

EGroups/yahooGroups

Yahoo

www.egroups.com

www.yahoogroups.com

Egroups is the largest provider of public discussion groups. It was acquired by Yahoo.

eCircle

eCircle

www.ecircle-solutions.de

www.ecircle.de

eCircle is a large provider of public discussion groups in Europe (under the URL www.domeus.com). The company is now starting a new strategic initiative, eCircle Solutions, aimed at supporting communities of practice for knowledge management. Their approach is to keep the platform very simple and to integrate knowledge exchange interactions as much as possible into e-mail so that it blends with people's work. They are expanding their discussion boards with facilities oriented to communities of practice such as file storage, yellow pages, newsletter, calendar, chat, and polling. Their target market is Europe.

Cassiopeia

Cassiopeia AG

www.cassiopeia.com

Webfair

Webfair AG

www.webfair.com

WeTalk

WeTalk Network

www.wetalknetwork.com

WeTalk Network is taking applications to offer its system to organizations that need it internally.

StuffinCommon/Teamwave workplace

Teamwave Software Ltd.

www.teamwave.com

Community rooms with a sophisticated whiteboard on which participants can not only draw, but place tools such as calendars, doors to other rooms, slide presentations, post-it notes, address books, etc.

Blaxxun Instant Community

Blaxxun Interactive

www.blaxxun.com

Blaxxun creates 2-D and 3-D simulated worlds for a combination of synchronous and asynchronous interactions between participants.

Other products

Distribution lists and bulletin boards have been in existence for a long time and are widely available. In addition to the product mentioned here, many companies focused on content and some members-only providers offer discussion groups to their customers, most notably AOL.

Synchronous interactions: on-line meeting spaces

These systems provide for synchronous interactions at a distance, for both small interactive groups and large audiences. They often use a combination of media, including audio and video, to provide an experience of co-presence. Some use physical analogies, such as auditorium, conference center, or building.

This is perhaps the category that is the furthest from producing complete community facilities by itself. Still, many distributed communities of practice are using teleconferences to conduct regular meetings, and the ability to add presentations, web tours and application sharing can make these meetings more productive.

Many synchronous facilities such as chats and presence awareness are increasingly incorporated into other systems.

Most conferencing systems can be leased for a single event. Some are even free for very small events.

Perspectives

There are three basic metaphors in this category, with a number of systems providing for more than one:

- *Virtual auditorium (one-to-many)*: PlaceWare
- *Moderated meetings*: Astound, Centra, Evoke, iMeet, Webex

- *Informal meetings (few-to-few)*: Netmeeting, SameTime
- *Synchronous conversation (any-to-any chat servers)*: ConferenceRoom, iChat
- *Chat-oriented virtual community space (many-to-many)*: Tapped in

Typical features

The feature sets are somewhat different for the various perspectives, but the most common features include:

- Presentation facilities
- Application sharing
- Web tours (visiting sites as a group)
- Audio streaming
- Video streaming
- Whiteboard
- Chat
- User reaction indicators (e.g., mood indicators)
- Polling and voting
- Presence awareness (participants list)
- Automated invitation
- Meeting access control (participant password)
- Minutes-taking and action-items facilities
- Recording/archiving
- Attendance reports

Products

Astound Conference Center

Astound Corporation

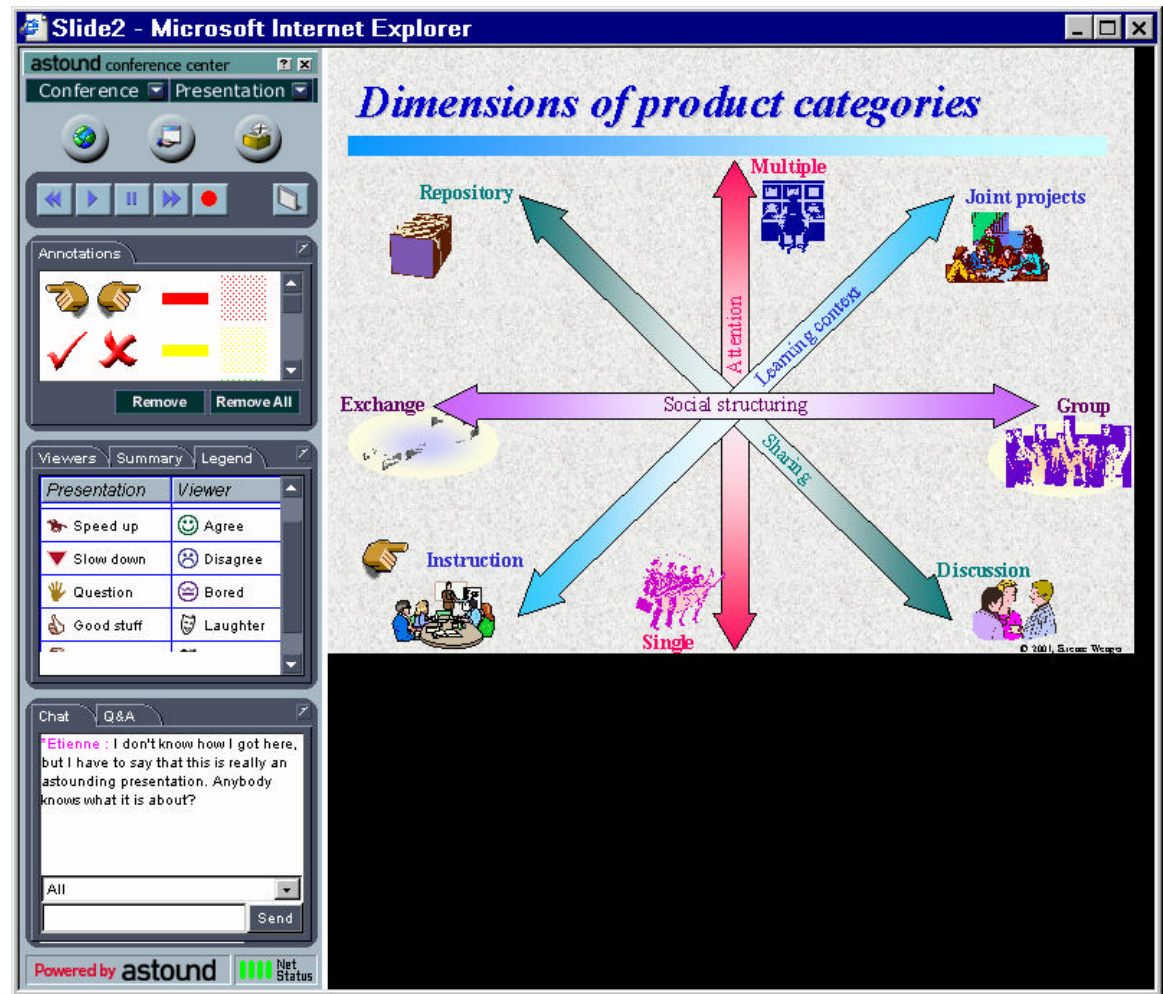
www.astoundcorp.com

Astound Conference Center is intended for moderated meetings of various sizes. It is a browser-based application that includes all the features listed above.

Prior to the meeting, the moderator loads up the presentation and invites participants (with the option of limiting access with a password for the conference). The conference can start right away or be scheduled for a specific time. The system will manage the flow of attendees, and even test their browser to make sure they will be able to participate fully.

During the meeting, more than one moderator/presenter can take turn facilitating the interactions. The facilities support two modes of interaction.

- In the conferencing mode, the moderator runs a presentation or a web tour. The audience can show their reaction by using “emoticons” or ask the presenters to slow down. Attendees can also chat, ask questions, and even open private side-conversation groups in the chat window (an ability moderators can turn off).



- In the collaboration mode, moderators open shared applications or white board, which all participants can also access. In this case, the whole group is actively involved on the screen.

Meetings can be recorded and archived for later viewing by those who could not attend.

Pricing structure

Contract: Astound can be leased as an ASP, per event or on a monthly/yearly basis. It is also available for licensing on a maximum meeting-size basis.

Prices: Astound's ASP pricing structure is more flexible and complex than typical products:

- Per event:
 - Up to three users, free.
 - More than three users (short meetings), 30 cents per user per minute.
 - More than 10 users: \$10 per person per event, regardless of length (15 with audio, 25 with video streaming).
- Monthly lease: \$200/month for 5 seats.
- Yearly lease: \$500 per seat per year.

Advantages

- Easy set-up with clear interface.
- Platform-independent
- The flat fee per attendee makes the use of the system quite affordable.
- Can support thousands of users simultaneously.

Disadvantages

- Moderators have to decide in advance exactly what slides to use because presentations must be uploaded prior to the conference. (With other products like Webex or Centra slides can be uploaded on the fly.)

Comments

Conferencing systems like Astound have become really easy to use and the prices have come down. We may have to learn a new set of norms of interaction.

PlaceWare

PlaceWare, Inc.

www.placeware.com

PlaceWare attempts to reproduce the experience of being in an auditorium.

Webex

Webex Communications, Inc.

www.webex.com

Similar to Astound, but also includes a virtual office space where people can visit even when the "owner" is not present, leave messages, add to the calendar, etc

Evoke

Evoke Communications, Inc.

www.evoke.com

Centra

Centra Software

www.centra.com

Marratech Pro

Marratech AB

www.marratech.com

iMeet

iMeet.com

www.imeet.com

OneStopMeeting

Teamwave Software Ltd.

www.OneStopMeeting.com

The Virtual Meeting

RTZ Software

www.rtz.com

NetMeeting

Microsoft

www.microsoft.com/windows/netmeeting/

Free software/service that includes application sharing, along with chat, whiteboarding, audio, and video.

SameTime

Lotus Development Corporation

www.lotus.com

Suite of products including: awareness, chat, application sharing, on-line meeting (includes Netmeeting)

ConferenceRoom

Webmaster.com

www.webmaster.com

Providers of chat servers for large applications.

Chatspace

ChatSpace Inc.

www.chatspace.com

Tapped in

SRI International

www.tappedin.org

Chat-oriented virtual space for educators to form communities, discuss issues, and share knowledge. The space is also used for some experimental distance-learning programs.

On-line instruction: community-oriented e-learning spaces

These systems provide space for explicit educational activities, some of which can be helpful to communities of practice. This is especially true when communities have a well-established body of knowledge and take on the responsibility of training newcomers.

At least one system by Pensare uses the metaphor of a community as its central teaching device in an original way and has adopted a strategy to establish a variety of communities around business topics among its alumni. But even the more traditional teaching space BlackBoard places a lot of emphasis on communities among students and among faculty.

The field of e-learning is booming and this report focuses on a very small slice of systems.

Perspectives

- *Community-based approaches:* Pensare
- *Enforced question/answer:* Athenium
- *Virtual asynchronous teaching space:* BlackBoard, LearningSpace
- *Virtual “live” classroom:* Centra, Interwise

Typical features

The feature sets vary greatly for the various perspectives.

- Storage of content material

- Open and directed ways for students to discuss content
- Synchronous and/or asynchronous delivery process
- Multimedia presentations
- Recording and broadcasting of classroom sessions

Products

Pensare

Pensare, Inc.

www.pensare.com

Overall description

Pensare is both a software and a content provider. The core idea of their approach is to create learning communities around well-established subject-matter material on a given topic. For now, their focus is on business knowledge (e.g., marketing, e-commerce, leadership, or customer relationships) but the approach is applicable to any domain. They contract with business schools to create educational material for online multimedia presentation, and they use their community-oriented learning platform to engage students in activities and discussions around this material.

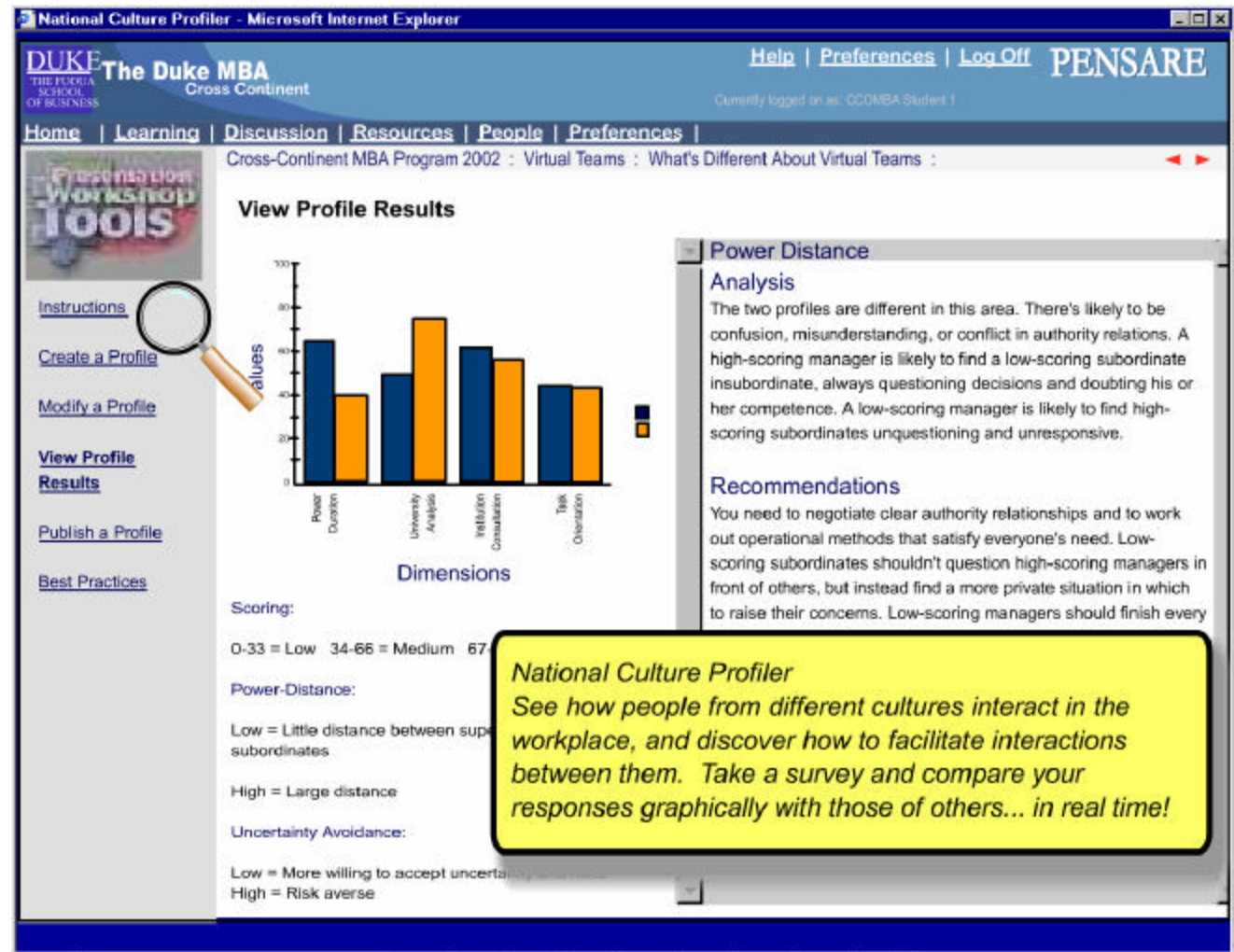
The tools they use for creating a community among students fall in two categories.

- They include general interaction tools such as discussion boards, chat, user profiles, notifications, and surveys.

- They also include content-specific tools and simulation exercises to encourage students to apply what they learned to their specific situation. For instance, with a presentation on cultural diversity, Pensare will get students to use a “cultural profiler form” to create a diagnostic chart of their own cultural style, and then encourage them to compare their results with others.

As a result of these interactions, the community ends up with two types of content: the primary content of the presentation and the content generated by the students.

The Pensare platform provides multimedia facilities for content presentation, interaction and application tools for building communities, and a series of development templates to create presentations, build surveys, enable student contributions to the knowledge base, manage action lists, and define processes (e.g., the steps for writing a good sales letter).



Pricing structure

- Contract:** Primarily on an ASP basis. Including content, facilitation, and technology.
- Prices:** Monthly fee per participant depends on content.

Advantages

The uniqueness of Pensare's approach is a combination of presentation of expert content with facilities for developing communities among learners by engaging them in activities that apply the theory and create opportunities for interactions through mutual evaluations, comments, and discussions.

Disadvantages

- Works only with access to sophisticated content providers and resources to turn this content into multimedia presentations.
- Mostly good for communities where members have a lot to learn about a subject about which there is much established knowledge.

Comments

Pensare's strategy is to build long-lasting learning communities around business topics, both within and across organizations.

Athenium

Athenium

www.athenium.com

Athenium provides a peer-to-peer e-learning environment in which students ask questions of each other as a way to learn about a topic. Each student is asked to come up with a question and a set of possible answers. Other students choose an answer and then are shown the answer preferred by the author of the question. There ensues a dialogue of justifications and all involved have an opportunity to change their minds.

The system keeps track of the work that students are doing and keeps an agenda of action they still need to take, for instance questions they have not answered yet. By making sure that every participant responds to every question, the process generates a body of knowledge shared by all.

This system can also be used for groups to brainstorm ideas or create new knowledge and come to a consensus (For instance, it has been used for groups of managers to discuss a new strategy.)

BlackBoard

Blackboard, Inc.

www.blackboard.com

FirstClass Collaborative Classroom Gold

Centrinity

www.firstclass.com/products/FCCC

Interwise Millennium

Interwise, Ltd.

www.interwise.com

LearningSpace

Lotus Development Corporation

www.lotus.com/home.nsf/welcome/learnspace

WebCT

WebCT

www.webct.com

Knowledge exchange: access to expertise

Many of the systems described in this report include facilities for “member profiles,” including “yellow pages” where members can describe their area of expertise and in some cases their preferences about how to be contacted.

The systems in this section focus on providing more sophisticated access to expertise. They often collect answers in banks of question/answer pairs to be accessed before turning to an expert. When they do have to turn to an expert, they attempt to use criteria such as general ranking, history of answers to questions in an area, or analyses of relationships to determine who is most likely to provide an answer. There is usually a way for the recipient of information to give feedback to the provider.

These systems can be used to form (usually fairly loose) communities, both in the consumer area and among experts inside an organization. At the very least they are certainly relevant for the “help desk” aspect of a community of practice. But they can also lead to the formation of communities among people who ask and answer questions on a given topic.

Perspectives

- *Explicit questions and answers:* Organik, AskMe, Question, Quik
- *Knowledge markets:* Clarity, Knexa
- *Enabling mentorship relationships:* CiviServer Experience

- *Background analysis of e-mail:* Tacit
- *Background analysis of relationships:* Discovery Engine
- *Best practices:* Sharenet

Typical features

- Question-asking facilities
- Profiles of experts
- Feedback mechanisms
- Reputation builder
- Automated ranking of experts
- Automated ranking of responses
- Automated access to databases of frequently asked questions

Sample products

Orbital Organik

Orbital Software

www.orbitalsw.com

Overall description

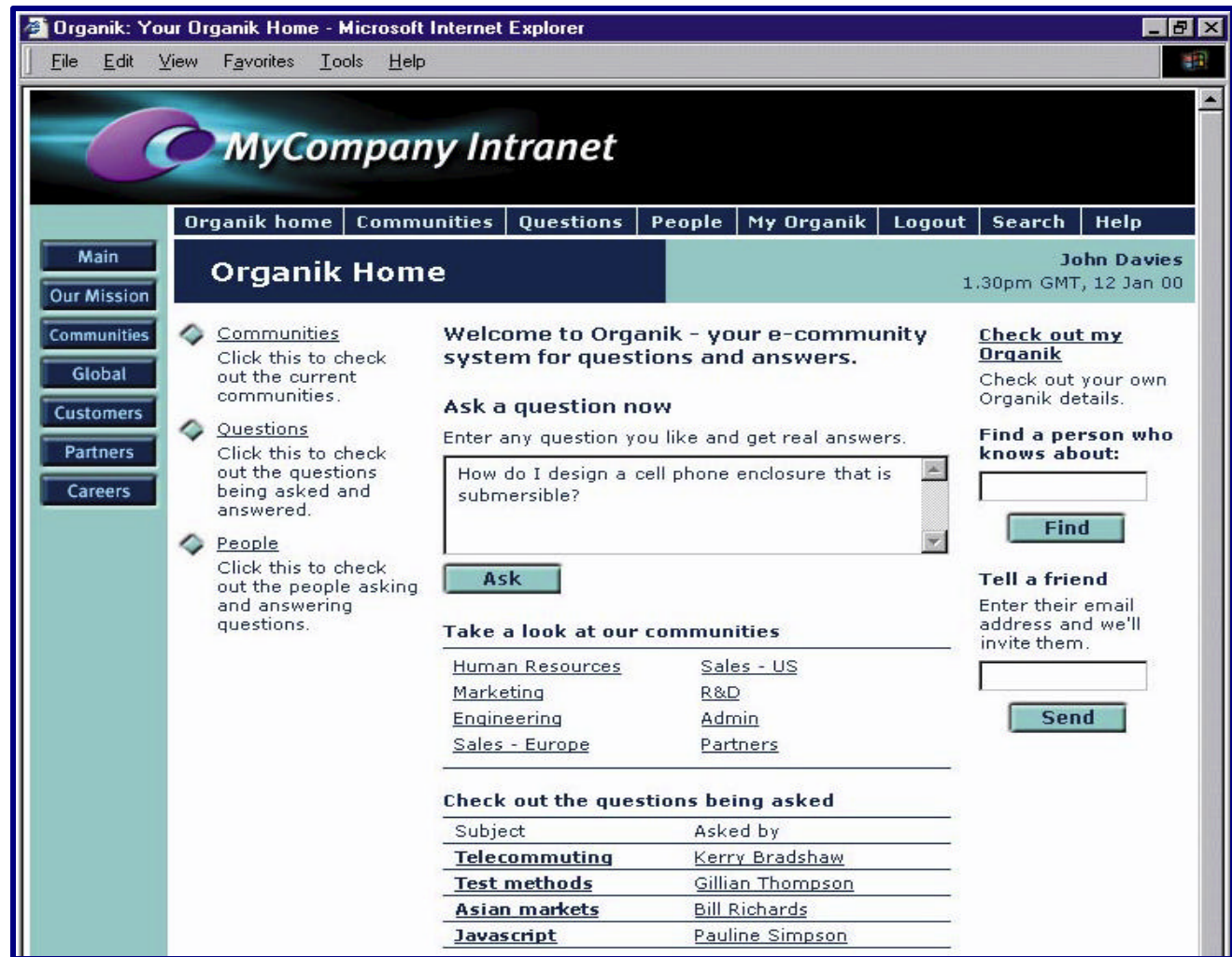
Organik provides access to information through a question/answer format. A user enters a question into the system. First, Organik attempts to match the question with a list of previously answered questions. The answers are ranked according to the likelihood that they will be relevant, including the success that the authors of the answers have had in answering questions in the past.

If Organik cannot find a ready answer or if no answer satisfies the user, it will suggest a list of “experts” from its roster who are likely to provide an answer. It then lets the user select the set of experts to whom the question should be directed.

The user can be notified by e-mail when an answer is coming back. If no answer is forthcoming, the system can keep the question alive and respond to the request when an answer becomes available.

When given an answer, the user is invited to provide feedback on that answer. This feedback is used to update the profile of the “expert.” Organik keeps a profile of each user of the system, which includes not only personal information, but also the history of questions posed and answers provided in various areas of expertise.

If the feedback is positive, the answer is also entered into the database of answers for further use. Over time, Organik builds a database of answers organized into areas of interest.



Organik also provides facilities for discussions. Any answer can turn into a discussion, which others can join. In fact, asking questions is not the only way to access expertise. Each area of interest defines a “community of interest,” which are listed on the front page, and which

users are invited to join by browsing the store of knowledge and participating in discussions.

Organik provides administration functions associated with these communities, including community and user metrics and rating of questions and answers.

Pricing structure

Contract: The software is licensed on a per-seat basis.

Prices: Prices start at around \$100 per seat, with substantial discounts for large contracts and open communities.

Comments

Organik can build communities of interest progressively, without having to build a large repository up front, or even knowing who belongs. The system can also be used as a module in a more general community platform.

CiviServer Experience

RealCommunities, Inc.

www.realcommunities.com

This first application built on the CiviServer platform (see description under “website communities”) provides a process by which people can form mentor/mentee relationships: searching for a mentor, negotiating a working relationship, and managing the reputation of mentors on the basis of feedback provided by mentees.

Participants who need help with an issue initiate a search for a mentor according to a list of criteria. The request for mentorship is then sent to a prospect, who can accept or decline. If it is accepted, the system provides a framework

for mentor and mentee to negotiate a contract, including duration and mode of interaction. At the end of the contract, the mentee is asked to evaluate the relationship. This evaluation is used to update the profile of the mentor.

The initial markets for this product are customer service (customers can seek each other as sources of experience and knowledge) and lifestyle websites (people with similar lifestyles, e.g., seniors, can help each other face common situations). But the system can find application in a number of domains.

AskMe

AskMe corporation

www.askmecorp.com

AskMe is as a public question and answer service (www.askme.com), but the company now offers its knowledge exchange engine for corporate applications.

Question

Question.com

www.question.com

Quiq

Quiq Inc.

www.quiq.com

Question and answer system focused on online customer service.

Clerity Knowledge Exchange

Clerity

www.clerity.com

Question/answer engine.

Knexa

Knexa.com Enterprises

www.knexa.com

Knexa provides a market system by which people who need information can bid for the help of people who have the knowledge, and potential providers can quote their price. The process is associated with topic-oriented communities.

ShareNet

Agilience

www.agilience.com

ShareNet is a product developed out of the best-practice and information-sharing system originally used at Siemens. It is a knowledge exchange system organized around a diverse repository of information that participants contribute by filling templates. They can then connect with one another by asking the system to search for specific pieces of information and link the requester with the author of relevant pieces.

Discovery Engine

Lotus Development Corporation

www.lotus.com

A recent companion product to K-station, which derives relationships automatically in the background by finding patterns of usage in the system.

Tacit Knowledge

Tacit Knowledge Systems, Inc.

www.tacit.com

Tacit builds profiles of participants by analyzing e-mail traffic and inferring the topics they are interested in or know about. This provides a way for people to get connected with others with whom they might not otherwise have linked up. The system lets participants control what their profiles say about them and who has access to their profiles.

Knowledge repositories: documenting practice

This is the mainstay of traditional knowledge-management systems. Making communities of practice a centerpiece of a knowledge strategy moves the primary focus from information management to social structures, but it does not make these traditional information-oriented concerns obsolete. Communities of practice do produce and share documents and other knowledge artifacts, which can be put in electronic form, and which they need to manage effectively.

There are a very large number of products in this area, ranging from simple facilities for sharing documents, to enterprise-wide information portals, to complex full-text search engines. These types of systems have been around for a long time and there is plenty of literature available to those who need more detailed analysis of the market. In this report, I will not even attempt to cover the whole spectrum of products or even begin to provide a representative list. A small sample is provided here to illustrate the kinds of issues associated with knowledge repositories. These sample products merely indicate what types of systems would be included here.

Perspectives

- *Sharing and managing documents*: DocuShare, Documentum
- *Databases*: Oracle, Notes, Microsoft SQL
- *Search engines*: Autonomy, Verity

Typical features

The feature sets vary greatly for the various perspectives.

- Storage facilities
- Security and access control
- Knowledge object types
- Organization of objects according to a taxonomy of content areas
- Document check-out
- Version control
- Search across document types
- Indexing
- Cataloging
- Summary document previews
- Creation and use of meta-data
- Recovery of deleted information
- Integration of disparate data sources
- Document conversion
- Subscription
- Administration facilities (e.g., account management, usage reports, etc.)

Sample products

DocuShare

Xerox Corporation

www.xerox.com/docushare/

Overall description

DocuShare is a web-based document sharing system. The idea is to create “virtual” group file system that can be accessed through a web browser. Authorized users can open, modify, and add documents.

DocuShare can accept any file format and organizes documents in a user-definable hierarchy of nested folders. In addition to collections of documents, DocuShare recognizes two native object types: calendar and discussion boards.

The entire system is web-based. Users can access and open files through their browser just as they would on their own disk drive, even without requiring the source application on their local machine. All documents are given a URL.

Access rights can be defined for groups, for individuals, and all the way down to the level of each single file. The system provides for version control and will lock a file that has been checked out to avoid conflicting changes by multiple users. A single file can appear in multiple contexts, and DocuShare ensures that the latest version is always retrieved from any context.



DocuShare uses the Verity search engine to provide full-text indexing and retrieval of documents. Users can subscribe to a document and be notified by e-mail when a change is made.

DocuShare provides standard administration functions, such as a log of activities, interface customization, and user account management.

Pricing structure

Contract: DocuShare is licensed as an off-the-shelf application running on Unix and Windows.

Prices: Price per seat starts at \$100 for the first 50 seats, down to \$40 per seat for 500 seats, and \$50,000 for unlimited seats.

Advantages

- Completely browser-based, no client software required, not even source applications for documents.
- Keeps files in native format.
- Fairly inexpensive for very large user groups.

Disadvantages

- Per seat price limits “peripheral participation” for small groups.
- No uniform data structure.

Comments

DocuShare could be combined with interaction oriented software, such as a discussion or a website community system, to provide a platform for multiple interrelated communities of practice.

Databases

Many of the systems described in this report use a standard database system to keep track of information. Many systems are compatible with more than one database system. The following are the most common:

Notes

Lotus Development Corporation
www.lotus.com

Oracle

Oracle
www.oracle.com

SQL servers

Microsoft
www.microsoft.com

Search and information structuring

Autonomy

Autonomy Corporation
www.autonomy.com

Verity

Verity Inc.
www.verity.com

A few other interesting products

Abridge

Abridge

www.abridge.com

Abridge attempts to build useful storage by routing e-mail into relevant folders associated with groups and topics. It allows people to CC their e-mail messages to groups they belong to. Abridge then does some semantic analysis of the content of the message to store it into categories. These categories are either defined by group members up front or suggested by the system after a pattern has been found.

Geneva Active Digital Library

The Learning Trust

www.learningtrust.com

The Learning Trust is attempting to merge knowledge publishing, communities, and e-learning into an integrated system. The Geneva ADL is a knowledge publishing system that supports authoring, validation, repository, and meta-libraries. The publishing system is associated with knowledge and learning communities for conducting authoring projects and on-line courses. Geneva provides communities with sophisticated support for discussion, (including simultaneous translation), search, statistics, and authoring projects (including version control and revision history). The discussions have the distinctive characteristic that they integrate asynchronous and synchronous aspects. When people are on the site at the same time, the discussion function as chat, and otherwise as a discussion board, but it remains the same discussion stream.

Documentum

Documentum

www.documentum.com

A classic document management system.

Vignette

Vignette Corporation

www.vignette.com

Content management for websites oriented to e-commerce.

Wiki

<http://c2.com/cgi/wiki?WikiWikiWeb>

Wiki is a free, interactive, open space for participants in self-organizing groups to create documents together. Wiki is always open to editing and documents evolve as participants create pages, edit each other's entries, and add new material. Over time, a Wiki space becomes a representation of a community's take on a topic.

Combining dimensions: convergence in the market

The product categories in Figure 1 were derived from an empirical study of the market. They reflect the primary (or initial) intention behind the products. Yet these categories do represent dimensions of a community-based knowledge strategy, which the designers of the products recognized as important and tried to address. The situation is reminiscent of the eight blind men of the folktale—touching different part of an elephant and thinking that an elephant is a trunk, a tail, an ear, or a rough surface.

As turns out, these dimensions taken together do capture something critical about communities of practice as stewards of knowledge. This yields a deeper interpretation of the product chart that goes beyond merely categorizing products. Under this interpretation, which is illustrated in the diagram, each axis represents a dimension of the social life of knowledge. Each involves a tension between two requirements that a community of practice needs to integrate in some unique fashion:

- ***Social structuring of knowledge: groups versus markets.*** The need to form specific social structures to allow ongoing participation in knowledge-creating and -sharing processes and the need to provide generalized mechanisms for accessing and exchanging knowledge across boundaries and create a market for expertise that can evaluate, recognize, and reward the contributions of various individuals. One way to interpret the figure is to see the right-hand side of the

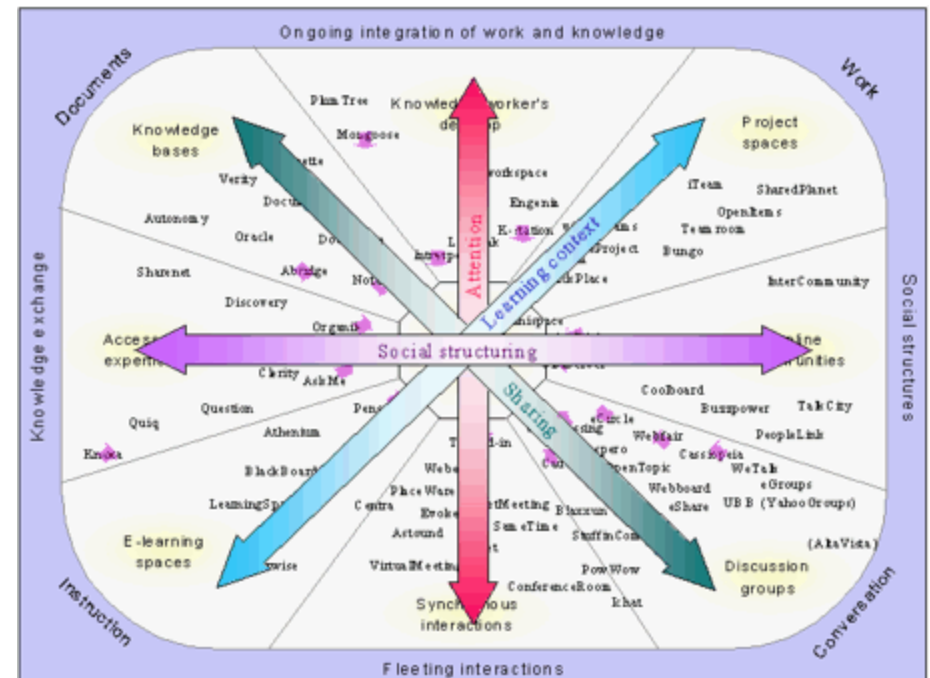


chart as various processes for creating and cementing knowledge-oriented social groups, and the left-hand side as processes for exchanging knowledge with or without the existence of a community.

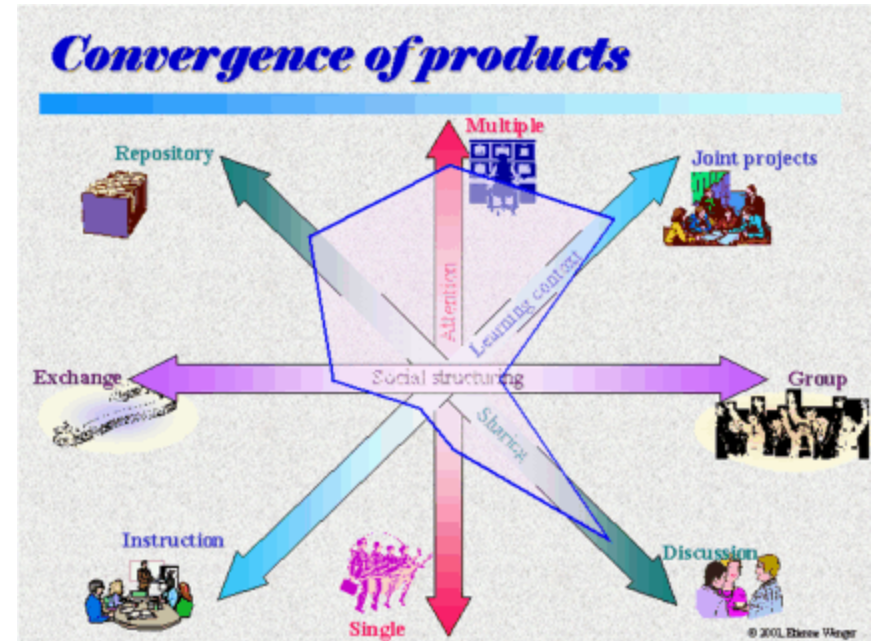
- ***The processes of sharing knowledge: interactions versus documents.*** The need to interact and negotiate meaning to create and share knowledge in the context of conversations among people and the need to create a repository to keep documents that capture this

knowledge but really have significance through the interactions they reflect.

- **Contexts of learning: instruction versus joint project.** The need to conduct specific activities oriented to learning specific skills and to have a context for working together. Balancing this dimension means connecting instruction-based learning and working-based learning with each other.
- **The management of attention.** The long-term need to support ongoing management of attention among the multiple demands placed on the knowledge worker versus the need to support synchronous interactions which call for the full but temporary attention of participants

Communities of practice are at the intersection of all these dimensions. Because these dimensions are all dimensions of the social life of knowledge, they need to be integrated in order to produce a full knowledge system. Learning depends on how well they work in concert and how well the two poles of the axes are integrated.

As system designers become increasingly aware of these dimensions and their interdependence, there is a convergence in the market of community-oriented technologies. More and more systems include multiple dimensions. For instance, the feature sets of many products on the right hand side of the chart are starting to overlap and will soon become indistinguishable. In fact,



systems that focus exclusively on one dimension are becoming rare.

The product-category chart was useful as a way to make sense of the market by categorizing early products. As the market matures, however, the dimensions are often more useful as a way to look at single offerings. The idea here is to represent how much a given product addresses the functionality of each dimension. This use of the chart will produce a “spider-web” evaluation of the product as illustrated in the figure above.

III. Understanding the role of technology

Experience has shown over and over that what makes for a successful community of practice has to do primarily with social, cultural, and organizational issues, and secondarily only with technological features. It is more important, therefore, to address these social, cultural, and organizational issues than to seek endlessly for the perfect technological platform. Still, an increasing number of communities of practice today are geographically distributed and must rely on some kind of technology for keeping in touch. And even those that are co-located often need to keep in touch between meetings and to create a repository for their documents. So technological issues are relevant and it is worth asking what technology can do: what are the areas where technology can be expected to help?

The description of the market of the last section refers to facilities. At a deeper level, building a platform for communities requires an understanding of how technology can help or hinder communities. Such an understanding is essential to decide what technology is expected to accomplish and to evaluate the potential of various products to contribute to achieving these results.

This section presents thirteen fundamental elements of successful communities of practice which technology can affect.

Time and space

1. Presence and visibility

A community needs to have a presence in the lives of its members and make itself visible to them.

2. Rhythm

Communities live in time and they have rhythms of events and rituals that reaffirm their bonds and value.

Participation

3. Variety of interactions

Members of a community of practice need to interact in order to build their shared practice.

4. Efficiency of involvement

Communities of practice compete with other priorities in the lives of their members. Participation must be easy.

Value creation

5. Short-term value

Communities of practice thrive on the value they deliver to their members and to their organizational context. Each interaction needs to create some value.

6. Long-term value

Because members identify with the domain of the community, they have a long-term commitment to its development.

Connections

7. Connection to the world

A community of practice can create value by providing a connection to a broader field or community that its members care to keep abreast of.

Identity

8. Personal identity

Belonging to a community of practice is part of one's identity as a competent practitioner.

9. Communal identity

Successful communities have a strong identity that members inherit in their own lives.

Community membership

10. Belonging and relationships

The value of belonging is not merely instrumental, but personal as well: interacting with colleagues, developing friendships, building trust.

11. Complex boundaries

Communities of practice have multiple levels and types of participation. It is important for people on the periphery to be able to participate in some way. And inside communities too, people form subcommunities around areas of interest.

Community development

12. Evolution: maturation and integration

Communities of practice evolve as they go through stages of development and find new connections to the world.

13. Active community-building

Successful communities of practice usually have a person or core group who take some active responsibility for moving the community along.

The following table examines each of these community principles and considers how technology factors can influence the success of community life along these lines.

For each success factor, the first column provides a general description, the second column a set of implications for supportive technology, and when appropriate, the third column suggests a few examples as illustration.

At this point, this table refers to existing technological factors and examples rather than speculating about future possibilities.

Principle	Technology implications	Examples
1. Presence and visibility		
<p>In collocated communities, people meet each other in the hallway or in the cafeteria. The community reminds itself to members in many ways. It is also more visible. At meetings, they can see who is there, even if people do not say anything.</p> <ul style="list-style-type: none"> ▪ Presence of community in the organization ▪ Presence of community to members ▪ Presence of members to the community ▪ Visibility of the community ▪ Knowing what others know, do or care about ▪ Impromptu interactions 	<ul style="list-style-type: none"> ▪ Pointers to the community ▪ Directories of communities ▪ Some “push” distribution, such a electronic newsletters, reminders, questions ▪ Member directories ▪ Who is doing what ▪ Presence awareness ▪ Instant messaging ▪ Virtual coffee smell 	<p>Many companies have added communities to their yellow pages.</p> <p>Communispace has an “enterprise-level” window that lists all communities.</p> <p>Universal subscription in Intraspect allows members to determine very precisely how they want the community to be made present to them.</p> <p>Most systems have a member directory with some ability for members to describe their areas of expertise and interest</p> <p>In Intraspect, you have various ways of seeing what is going on and who is involved in what</p> <p>Many systems, even inexpensive discussion boards, now have a list of who is on</p> <p>Presence awareness is usually associated with a capability for instant messaging so you can interact with people you see present.</p> <p>Xerox PARC has experimented with a sensor that indicates on everyone’s screen when a new pot of coffee is brewed</p>

2. Rhythm

<p>Communities exist in time and they need a rhythm of events and rituals that reasserts their existence over time.</p> <ul style="list-style-type: none">▪ Regular meetings bring a sense ongoing routine▪ Unusual meetings break the routine and bring some excitement▪ Milestones▪ Projects underway▪ Waves of hot topics	<p>The web allows for asynchronous participation, but the danger of a pure web-based presence for a community is its timelessness. It is always possible to participate, but by the same token, there is never a special occasion to participate. A web-based presence can contribute to a sense of communal time:</p> <ul style="list-style-type: none">▪ Community calendar▪ Reminders▪ Synchronization of calendars▪ Synchronous events, such as teleconferences, virtual conferences or online meetings▪ Invitations▪ Minutes of recent events made available quickly afterwards▪ Hot topics	<p>Local calendars are very common now Calendars can send reminders More sophisticated local calendars are coordinated with a person's main calendar, allowing to view events from a variety of groupings. All virtual conferencing and meeting systems can offer this kind of capability. Some can record the meeting for those who could not attend. Most conferences systems such as Astound, PlaceWare or Webex will automatically send invitations and rescheduling notices by e-mail. Astound has facilities for taking and accessing minutes and action items.. Some systems let you see at a glance which conversations are most active (Communispace, Webcrossing, etc.)</p>
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3. Knowledge-generating interactions

<p>Members of a community of practice need to be able to interact regularly and meaningfully in order to develop their shared practice.</p> <ul style="list-style-type: none">▪ Multiple channels and forms of interaction▪ Forums for thinking together▪ Problem-solving▪ Discussing ideas▪ Exchanging views▪ Sharing news▪ Lectures/workshops	<p>Each community has unique needs and it is important to support the kind of interactions that enable community members to develop their knowledge. Standard offerings include:</p> <p>Asynchronous</p> <ul style="list-style-type: none">▪ E-mail and discussion boards▪ Document checkout/version control <p>Synchronous</p> <ul style="list-style-type: none">▪ Lectures and large meetings▪ Application sharing▪ Web tours	<p>Available as a standard on most systems</p> <p>Most project spaces like Eroom or QuickPlace have facilities for multiple people to work on one document, by checking it out to avoid version conflicts</p> <p>Many online meeting systems offer conferencing with presentation engine and stream audio, sometimes video</p> <p>Application sharing in meeting and conference systems allows members to discuss problems and help each other in the very application they use to address a problem (e.g., staff for musicians, spreadsheets for accountants)</p> <p>Many conferencing systems have a “web tour” facility. We found web tours very useful in conducting online workshops. They can also be used for small benchmarking expeditions.</p>
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4. Efficiency of involvement

<p>Communities of practice usually compete with other priorities in the lives of members. It is crucial to make participation as easy and efficient as possible:</p> <ul style="list-style-type: none">▪ Ease of participation▪ Integration with other aspects of life, like daily work or other communities▪ Management of attention▪ Flexibility in time management	<p>Having to learn a whole new system makes it more difficult to participate. So does every additional click. A less than optimal solution that makes participation easy can often be better than a difficult optimal solution.</p> <ul style="list-style-type: none">▪ Integration with work systems▪ Personalized knowledge/application portals▪ Subscriptions▪ Tours of new activity▪ Content filtering and ordering▪ Archiving of interactions: interactions tend to leave a trace online	<p>Knowledge desktops integrate knowledge and work to make participation in communities seamless.</p> <p>A growing number of systems, not just the expensive knowledge desktops, have a “myThisSystem” that provides multiple windows unto various relevant groups or forums (myLiveLink, K-station, myCommunispace, myPlaceWare, myeRooms, etc.)</p> <p>In Intraspect, you can subscribe to any piece of information you want to keep track of, even a search. You will be notified of any change.</p> <p>Caucus has a feature by which you can be taken to all the areas where there is new activity</p> <p>In the tour of new activity, Caucus allows the user to hide certain area and determine the order in which to proceed</p> <p>Most chat systems support recording and archiving of chat content</p>
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5. Short-term value

Communities of practice thrive on the value they deliver to their members as well as to the organization. Members vote with their feet (or keyboards). In the short-term, they need to find immediate value in their participation:

- Quick access to information
- Access to expertise
- Answer to questions
- Help with problems
- Preserving the time of experts is another important concern, which adds short-term value to them. Generally, experts appreciate processes by which only really difficult questions and problems come to them.

- Mechanisms for asking questions
- Lists of FAQ's
- Databases of answers
- Intelligent access to experts: even good search facilities can be frustrating and much of the community's knowledge is not explicit. A system can also support access to experts, while attempting to preserve expert time.
- Forums for getting help with problems
- Brainstorming facilities

A number of systems such as Orbital Organik and AskMe build communities on questions and answers

ArsDigita has a special module for posting lists of FAQ's

Q&A systems such as Orbital store answers to questions and attempt to match new questions with existing answers before turning to experts

Q&A systems rank experts and have sophisticated ways of directing questions to people who are likely to have an answer and of ranking answers according to the likelihood they will be useful.

At BP they used cameras to help an expert guide a person through solving a problem on a well-drilling site. Application sharing can serve a similar purpose.

Communispace has a brainstorming facility that guides a community through brainstorming stages

6. Long-term value

Because members also identify with their domain, the value that the community delivers also has a long-term dimension. It derives from a sense of accumulation over time

- Define “best practices” or common methods and processes
- Produce and store artifacts, tools, documents
- Maintain the knowledge base to keep it up to date and usable
- Learning agenda: a community can take charge of its practice and agree on a list of areas to develop
- Practice-building projects: mature communities of practice often spawn project teams to work on specific practice-development tasks on their learning agenda, such as developing a template, a tool, or a manual

- Repositories for artifacts
- Taxonomies
- Search mechanisms
- Discussing and updating a learning agenda
- Project spaces for practice-development projects

Many systems can associate a set of folders with a communal space. But there are very different levels of sophistication in the structure of these knowledge bases and what can be done with them, from simple file folders (QuickPlace, DocuShare) to complex document databases (Intraspect, LiveLink)

Hierarchical file folders can/should reflect the taxonomy members use to think about their practice

Many systems have search facilities for local interactions, but more expensive systems such as Intraspect and even DocuShare have full-text searching of all uploaded material independently of format.

Any discussion board could do here. But more sophisticated systems exist, including brainstorming and voting. Communispace has a facility for “framing questions.” The enforced question/answer process of Athenium has been used to discuss a strategy among a group of managers.

Subgroup areas exist in a number of systems, including Communispace, QuickPlace, and WebCrossing

7. Connections to the world

<p>The value of belonging to a community of practice derives not only from having access to peers, but also from having access to the leading-edge in the broader world:</p> <ul style="list-style-type: none">▪ What is happening▪ What is hot in the field▪ New developments, new technologies▪ Evaluation and reviews▪ External experts▪ Reference material	<p>Technology cannot replace one's network of connections in a field. But it can provide some facilities.</p> <ul style="list-style-type: none">▪ News▪ Announcements of external events▪ Directory of external experts▪ Links to other sites▪ Library of references	<p>These facilities can be implemented in most systems.</p> <p>Many systems have news areas. QuickPlace and Intraspect can even tap into news feeds.</p> <p>These announcements can be integrated in news area or calendar, or into a reminder system</p> <p>Communispace has a specific area for a library for references.</p>
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8. Personal identities

Personal identities are a crucial aspect of participation. Members bring their identities to the community and their participation both develops and shapes their identities. Over time, community participation creates both commonality and differences between people.

- Personal passions
- Competence
- Areas of specialization
- Reputation/assessment/rewards
- Various roles people play in the community
- Multimembership: people belong to more than one community or group at any one time
- Personal trajectory: people's identities change over time within a community and as they move from one community to another

The web provides many new possibilities, explored and unexplored, for people to create a visible identity and to access their communities in personalized ways.

Many of these facilities are still primitive, but rapid progress is being made.

- Profiles
- Synchronizing profiles across communities, with multiple views
- Reputation and ranking
- Preferences
- Personal history
- Private places

Personal profiles can become fairly complex. Tacit expands a person's profile by looking at e-mail exchanges

Knowledge worker's desktop as well as systems like CiviServer and Communispace provide for synchronized profiles across multiple communities

Q&A systems develop complex expertise profiles based on the answers people give and the feedback they receive. CiviServer includes a "reputation engine" that can develop a profile for members according to a set of variables defining behaviors and a grading system.

Personal portals aim to personalize the experience of each participant. Simpler systems like Caucus or Webcrossing have parameters that users can set to customize the way information is presented.

Most community-oriented systems can recognize a participant from one session to the next and place flags like "new" to guide navigation. Eventually, expect systems to adapt their response according to a deeper history of the user.

A successful aspect of an online space I designed for a workshop on communities is that each student has a personal space that students can furnish and where others can visit.

9. Communal identity

A community of practice thrives on a sense of communal identity. Members inherit this communal identity. A sense of place can help a community develop an identity, but many communities do not have a physical place. In addition, a communal identity depends on:

- Clarity about domain and sense of mission
- Personal passion
- Reputation of the community
- Value to the organization
- Success stories
- A distinctive style

- Being able to have and furnish a communal place
- Give the community a public presence
- Giving public access to the “source documents” of the community (mission, domain definition, “constitution,” policies)
- News about the effects of the community, success stories
- Have a distinctive look and feel

Provide a virtual place for participation

Members can point others to the homepage of their community

Many systems have an area for explaining what the community is about.

Many spaces have a “news” area. ArsDigita’s module for banners could be used too.

Customizable interface in most systems, with varying levels of control for community coordinator

10. Belonging and relationships

Belonging to a community of practice can be an intensely personal experience based on deep relationships with other members.

- Professional connections
- Peer interactions
- Personal relationships
- Trust
- Helping, mentoring, teaching
- Reciprocity
- Finding a voice

While there are no substitute yet for face-to-face interactions for this purpose, technology can provide some support.

- Personal profiles can reveal unexpected aspect of member's lives
- Supporting private interactions and interpersonal relationships
- Supporting mentoring relationships
- Some people find it easier to express themselves in writing and they suddenly find a voice when the conversation moves online
- Chat moderators have observed that it is less easy for "powerful" people to hold the floor with longwinded discourses

Communispace encourages members to talk about themselves, to reveal their hobbies and other interests, and to include all sorts of pictures in their profiles

CiviServer has a whole facility for discovering, negotiating, and managing mentoring relationships

11. Complex boundaries

Managing boundaries is an important challenge for communities. Boundaries around a community of practice are both unavoidable (only some people are practitioners) and useful (it is necessary to know who is a member in order to communicate efficiently). Managing community boundaries is difficult, however, because these boundaries are complex.

- It is crucial to design multiple levels and types of participation, allowing people to have different relationships with the community
- An active core group may need to have special interactions
- Peripheral participation: many people who are not full members have an interest in the domain of a community
- Subcommunities and special interest groups are very common especially as a community grows.

This is a difficult aspect for most systems because boundaries in communities of practice are both porous and fluid.

- Differential access rights
- Lurking facilities
- Public areas as well as restricted community space
- Subspaces
- Nested features
- This has implication for the pricing structure

Intraspect can associate a whole policy of access rights with any area or bucket of information in the system. In most cases, the access policy is visible even to those who do not have any access right. This creates a level of transparency.

Many systems allow an administrator to declare certain areas read-only for some participants.

Because of password authentication, systems tend not to provide for a public area for visitors, though this would not be very difficult to implement

Many systems provide for nested subspaces. Folder-based discussion systems like Webcrossing can nest unlimited numbers of conversation spaces.

By default, nested spaces inherit the feature sets of the “parent” space

Pricing based on volume of activity provides the easiest way to have flexible boundaries.

12. Evolution: maturation and integration

A community of practice evolves over time. What brings it together, how members interact, and how it develops knowledge in its domain all change as the community matures.

A community evolves in two directions.

- It goes through developmental stages internally.
- It changes its relationship with its environment.

It is important for a platform to be able to evolve along with the community so members do not have to move to another platform and learn a whole new system.

This creates a tension in developing a general platform:

- Not too expensive to start so that initial commitment can be somewhat tentative
- Have enough features to support maturation
- Flexibility in configuration
- Ongoing reflection, assessment, and redirection

This is an area where the general use of a knowledge worker's desktop is very helpful. It makes it very easy to start new groups, be they teams or communities of practice, and yet there is plenty of plumbing underneath the system to support more sophisticated needs in the future.

Communispace and the CiviServer Workbench have parameters and switchable functions that enable a constant reconfiguration of the space (See next principle.)

13. Active community building

Thriving communities usually have members who take an active role in cultivating the community. For instance, an apt community coordinator is a good predictor of how alive a community is. But it is a sign of health when other members get involved also.

- Coordination/administration
- Self-governance
- Managing the repository
- Reflection on the vitality of the community
- Evaluation of its achievements
- Assessment of value delivered
- Monitoring the health of the community

Systems to support communities of practice must offer a variety of administrative tools to monitor and configure the use and effectiveness of the community space.

- Logs and statistics for monitoring
- Polling and voting facilities
- Assessment tools and surveys
- Health indicators
- Administrative help and reminders
- Switches and policy enforcement algorithms

Both Communispace and CiviServer have a community-development console to help coordinators in their work.

Most systems keep a log of activities though they vary in the ease of access and representation.

Available on many systems, including conferencing

ArsDigita, Pensare and Astound all have automated templates for creating surveys

Communispace has a series of indicators that are made available to all members to encourage reflection on the health of the community. These include achievement of mission, intensity of interaction, level of trust, personal relationships, etc.

Most project spaces give the project leader the ability to sign on members

CiviServer WorkBench lets community coordinators decide on an ongoing basis how behavior or the feedback given to mentors will be turned into a reputation profile.

IV. Development and evaluation strategies

The categories and factors discussed in this report suggest some basic approaches and a number of basic questions to consider when developing a technology platform for communities of practice.

Four potential approaches

The four strategies listed here are in increasing order of complexity and investment.

1. *Just use what you have*

Communities of practice have functioned in organizations long before technologists and managers tried to provide specific facilities for them. The basic communication technologies that most organizations already have can be enough for some communities. E-mail systems usually have facilities for creating simple distribution lists. Most organizations have some kind of file repository system. Teleconferences facilities are almost ubiquitous. This simple approach may not be very exciting for the technology savvy, but it is a place to get going until more specific needs are established.

2. *Start with a simple facility*

Under this approach, you build a platform by providing a useful but limited facility in one product category to jumpstart the process:

- Determine in which of the product categories the main activities of your communities best fit.

- Provide a base system, depending on the primary needs of your communities.
- In due time, build an expanded platform by adapting the base and adding components.

Each product category could reasonably form the basis of a strategy for developing such a platform. Let us look at some examples that some organizations have adopted.

- **Discussion groups.** Many communities start as conversations. So providing a conversation utility where people can open a discussion is a good place to start. Many discussion board products, such as Web Crossing, Webboard, UBB or E-Circle are customizable and expandable. Some already have file storage facilities, for instance. And communities may have access to existing storage/retrieval/search systems anyway.
- **Teamware.** Many project-oriented workspaces such as eRoom or Quickplace can be adapted for community needs, and people may be familiar with them. Some communities even start around a project, such as a problem that needs to be solved and brings the members together.
- **Access to expertise.** A Q&A system such as Orbital allows a community to start slowly, without intending to be a tight-knit community and through knowledge exchange explore common ground for a community.

- **Document sharing.** DocuShare or Abridge can provide the kind of shared storage that complements ubiquitous communication facilities such as e-mail and phone as an initial way to build communities.

Many of these facilities are relatively inexpensive or have pricing structures that start very low and grow with usage. This approach also gives you time to see where the market is going before committing to anything too deeply. You may even find a provider who has an interest in entering the community of practice market and is willing to work with you to expand their systems.

3. Deploy a community-oriented system

A number of community-oriented companies, such as Communispace, RealCommunities, and ArsDigita aspire to become integrators of facilities and applications that expand the basic community framework they offer. They do this through partnerships and by building compatibility and modularity into their systems.

You may also want to be the integrator yourself and put together a coordinated suite of affordable community support technologies. This requires more work on your part, but it allows us to choose the best in every category.

4. Build on an enterprise collaboration system

If price were no object, a knowledge worker's desktop, such as Intraspect, LiveLink, or Engenia Unity would be attractive because many of the more complex facilities are in place. These systems often do not have the kind of specialized communal space that community-oriented

systems can create. As a result, they are not as good at giving a community a sense of identity and distinct style. But given the complex facilities they provide it would usually be relatively easy to add on community spaces with a distinct identity.

Just for communities of practice, these systems would be too expensive and an overkill in most cases. This approach would only work in conjunction with the adoption of the system as a collaborative platform for the extended enterprise. And in cases where such a system is already in place this approach makes a lot of sense. For instance, many organizations are already Lotus customers and creating a family of QuickPlace templates for communities of various types would allow new communities to be set up quickly. Lotus' K-station can be used to integrate membership in multiple communities with work on projects.

This list is not meant to provide a complete list of potential strategies. The idea is to generate a conversation to devise a strategy appropriate to each unique situation.

Issues to consider

No matter what approach you adopt, here are a number of questions to ponder.

1. What types of communities are you trying to support?

It is crucial to understand the kind of communities you want to support and the kind of activities they engage in and relationships they develop:

- How well defined is the domain of knowledge?
- How tightly knit is the community?
- Are they likely to know each other? To have established reputations?
- What is the main goal of the community?
- How much common knowledge are they building?
- How much work are they doing together?
- Are interactions mainly discussions, such as expressing opinions?
- How important are documents, tools, and other artifacts?

These questions will help you think through the product categories best suited for these communities and the best entry point into the development of a technology platform for communities of practice. For instance, if the communities mostly want to have good conversations on-line and share a few documents, fairly cheap solutions can be developed easily and made available for wide use at low cost.

2. What are you trying to accomplish with technology?

You need to decide which community success factors you are trying to prop up and then evaluate your choices of technologies accordingly.

- What aspects of the life of a community does technology need to enhance?
- What is the practice of the community and how can technology support it?
- Does the design of the system address the necessary success factors appropriately?
- How well do the pieces together?
- How easy is it to integrate potential new pieces?

3. Do you want technology to modify behavior?

You also need to decide what the system says about the place and role of communities in the organization. An aspect of this question is how much behavior modification you want to promote. All technologies to some extent influence behavior by placing emphasis on or facilitating certain processes, but some companies also take intentional steps to make their technologies reflect some principles or processes and influence behavior accordingly.

Some systems are designed as general utilities and some are designed to encourage certain behaviors. Some are meant to blend seamlessly into the way people behave

already, for instance by using e-mail a lot. Others are meant to encourage specific behaviors, such as logging on to a distinct community space or reflecting on a model of how a community behaves.

- How well is the system integrated into how people work?
- What model of collaboration does a system reflect?
- How much work will the behavioral modification require?
- Is it worth the trouble?
- How well are the community-oriented facilities integrated with existing systems that provide some of the needed functionality (e.g., databases, document management, enterprise systems and portals)?

4. What are the effects of pricing structures?

Considering pricing structures is important because the pricing structure of a system has direct implications on its usability as a general platform for communities of practice, in terms of both community development and individual participation:

- While some communities of practice are very formal from the start, others begin informally, with little or no support from the organizations they are in.
- While some have a clear idea of the value they will provide to the organization, others are much more tentative.
- Most communities need to have flexible boundaries, supporting multiple levels of participation, including very peripheral.

Whether the systems are hosted as ASP (Application Service Providers) or licensed/sold, the market offers four main types of pricing structures.

- ***Per community*** (e.g., Communispace—with limited membership, RealCommunities—without limit): good when communities have a clear sense of value and when boundaries do not need to be too open.
- ***Per seat*** (e.g., Intraspect, Orbital, DocuShare): good when the whole organization has the system so communities can be started anywhere and anyone can participate at the level they choose.
- ***Per volume of activity*** (e.g., Webcrossing, eCircle): good for general platforms, especially when communities may start without having to demonstrate value up front. Allows peripheral participants to be included without “taking up “ a seat. Good for inter-organization communities.
- ***Outright purchase without limitation on usage*** (e.g., Webboard, UBB, and most licensed systems beyond a certain usage): ideal for general platforms, but is usually true of small, inexpensive off-the-shelf systems or of expensive “unlimited usage” level licenses. It also requires in-house ability to handle issues of maintenance and technical support.

Questions regarding pricing would include:

- How many communities are expected?
- How formal do you want the launch of a community to be?
- How much peripheral participation should the system support?
- How many and what kinds of boundaries are communities expected to cross?
- Who will pay for the technology?

5. What are the requirements of the technology?

Support. You need to consider the requirement for local support. For instance, some system requires a thick-client component on local machines, which must be installed by an IT department, while increasingly common browser-based or thin-client applications do not require local technical support.

Programming. You need to consider the requirement for programming skills. For instance, ACT is free, but unless you hire the services of ArsDigita, using the system requires a group of skilled programmers who are interested in joining the ArsDigita community.

Systems requirements. In this report, I have not addressed issues of systems requirements, such as supported hardware and software platforms as well operating systems and database compatibility. These issues are of course important in the selection of particular products, though the trend towards ASP and the increasing use of open standards like Java and XML may decrease the prominence of these types of question.

What part can technology play?

Finally, I would like to reiterate that technology is only a small factor in the success of communities. One cannot emphasize this enough. Cultural, organizational, personal, and cognitive factors have much more influence.

- Organizations must learn to support communities and integrate them in the way they go about their business.
- Communities must develop the practices of joint inquiry that enable them to learn and create knowledge.
- Individuals must learn to participate productively in these processes.

Companies that have adopted a systematic community-based approach to their knowledge strategy have not counted on technology to do the job. They have all put together a small “support team” of internal consultants who help in a light-handed way guide communities through their development and coach community coordinators. Technology, therefore, can only be part of a broader organizational transformation that makes community participation a central aspect of participation in the broader organization.

Additional resources

In addition to the product homepages listed in this report, a number of sites maintain useful information, including articles, reviews, and announcements. These sites mostly focus on online communities in general, rather than communities of practice.

www.communitytechnology.org

The Alliance for Community Technology (ACT) offers discussions and reviews of a range of community-oriented products (groupwork products).

www.forumhosts.com

A website dedicated to online discussion spaces, with (sometime scathing) reviews of a number of products in this category.

www.fullcirc.com/commresources.htm

A wide-ranging set of resources for online facilitators, including tips, articles, and discussions of a few software platforms.

www.onlinecommunityreport.com

An online newsletter covering a variety of topics related to online communities, including articles and product reviews.

www.teleport.com/~smithjd/CP_bib

An extensive bibliography on communities of practice with some links to software resources.

www.technography.com/html/coworking.html

Coworking is a newsletter that covers a variety of topics on online collaboration. The archive contains some product reviews and discussions.

www.thinkofit.com/webconf

Reviews and articles on web conferencing software with a very comprehensive list of commercial and free products.

www.voght.com/cgi-bin/pywiki?CollabTools

A wide-ranging list of community-oriented software with URL's.